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In May, 1942, the American microbiologist Selman Abraham Waksman received a letter from his son: "In reading the reprints you sent me, I was struck again with the urge to do some work in the direction of finding an effective *in vivo* antagonist to the tubercle bacillus. I was particularly impressed with the relative simplicity of the method you have used in isolating fungi-producing antibiotic substances, and I wondered if exactly the same method could not be used with equal ease to isolate a number of strains of fungi or actinomycetes which would act against *M. tuberculosis.*"

"The time has not come yet," Waksman replied.[1] Yet, within two years Waksman discovered streptomycin[2] and boldly proclaimed, "With the isolation

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1. Selman A. Waksman, *My Life with the Microbes* 231-33 (Robert Hale Ltd, 1958).

2. See Waksman, *My Life.* Even at the time of Koch, who discovered the tubercle bacillus in 1882, physicians attempted a bewildering number of medical treatments without empirical evidence of their efficacy. See Charles V. Chapin, *What Changes Has the Acceptance of the Germ Theory Made in Measures for the Prevention and Treatment of Consumption?* (1885), discussed in Barbara Rosenkrantz, *Science and Public Health: Forever at the Crossroads,* Speech at the Institute of Medicine (Oct 1991).

of streptomycin, it was at once recognized that we possessed here a chemotherapeutic agent which, next to penicillin, was bound to revolutionize medicine. . . . Its greatest potentialities were found to lie in its capacity to suppress one of the oldest and most vicious enemies of mankind, tuberculosis."[3] By the early 1970s, streptomycin was largely replaced by more modern anti-tuberculin medications, such as rifampin and isoniazid, that could usually cure the disease and render the person non-infectious.[4] It was with these scientific observations that the focus of legal, medical, and social interventions began to shift to strategies designed to ensure that persons with tuberculosis took the full course of their medication.

So it was with tuberculosis, as with many infectious diseases, that the biological realities powerfully affected social and legal thought about government interventions.[5] The modern HIV epidemic is informed by the biological facts that it is transmitted primarily through the sexual or needle-sharing behavior of consenting adults and that there are no truly effective therapeutic interventions. At the end of the first decade of the HIV epidemic, efforts to control the disease were "voluntaristic at their core."[6] With relatively few exceptions, public policy has focused on testing with informed consent, pre- and post-test counselling, and education.[7]

The historical traditions of tuberculosis control have been quite different. Broad-based education campaigns at the turn of the century failed to produce the significant results hoped for by public health officials.[8] Indeed, the more

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3. Waksman, *My Life* at 213 (cited in note 1). In explaining the balance of benefits and adverse effects of streptomycin, Waksman stated the following:

> When, in time, streptomycin came to occupy an important place in chemotherapy, when the demand for it throughout the world increased at a far greater rate than it could be manufactured, when thousands of patients began to benefit from it, when especially sufferers from such diseases as meningitis had a thirty-five to seventy-five per cent chance of recovery, as compared to none previously, the side reactions began to attract increasing attention.

Id at 214.

4. See Peter A. Selwyn, *Tuberculosis and AIDS: Epidemiologic, Clinical, and Social Dimensions*, 21 J L Med & Ethics 279 (1993); World Health Organization, *Treatment of Tuberculosis: Guidelines for National Programmes* (Macmillan/Clays, 1993).

5. See generally Barbara Bates, *Bargaining for Life: A Social History of Tuberculosis, 1876-1938* (Pennsylvania, 1992); Sheila M. Rothman, *Living in the Shadow of Death: Tuberculosis and the Social Experience of Illness in American History* (Basic, 1994); Waksman, *My Life*; Barbara Gutmann Rosenkrantz, ed, *From Consumption to Tuberculosis: A Documentary History* (Garland, 1994).

6. Ronald Bayer, Nancy Neveloff Dubler, and Lawrence O. Gostin, *The Dual Epidemics of Tuberculosis and AIDS*, 21 J L Med & Ethics 277 (1993).

7. See generally Ronald Bayer, *Private Acts, Social Consequences: AIDS and the Politics of Public Health* (Free Press, 1991); Larry Gostin, *A Decade of a Maturing Epidemic: An Assessment and Directions for Future Public Policy*, 16 Am J L & Med 1 (1990).

8. See Rosenkrantz, ed, *From Consumption* at xiii ("Despite aggressive educational campaigns to inform the public about how to prevent the spread of tuberculosis and encourage the hope for recovery through the 'rest cure' if the disease were discovered at

that health departments emphasized the danger of tuberculosis with the apparent certitude of science, the more legal authority they gained to regulate the behavior of the sick.[9] "The more support the public gave to regulations, the more the options and movements of persons with tuberculosis were restricted."[10] Hermann Biggs, a key anti-tuberculosis reformer in the New York City Health Department around the turn of the century, presented this vision of the imperative of coercion: "The sanitary measures adopted are sometimes autocratic, and the functions performed by sanitary authorities paternal in character. We are prepared, when necessary, to introduce and enforce, and the people are ready to accept, measures which might seem radical and arbitrary, if they were not plainly designed for the public good, and evidently beneficent in their effects."[11]

The biological realities of technological identification of persons with tuberculosis, airborne transmission, and, later, effective antibiotic treatment shaped the social and legal context of the tuberculosis epidemic. Like the modern HIV epidemic, there were innocent, as well as guilty, victims of tuberculosis. For some, tuberculosis was merely an unfortunate result of underlying social conditions—crowded housing, poor sanitation, inadequate nutrition due to poverty. For others, however, it was a matter of personal moral failing and a life of vice. Having contracted tuberculosis through "ignorance or carelessness," the tubercular spread "their infectious sputum everywhere without any regard to the danger."[12]

Scientific advancement, then, did not necessarily signal beneficence toward persons with tuberculosis in the form of care or treatment. Understanding the scientific basis for transmission also instilled fear, created stigma, and led to ever-greater uses of compulsion. "The more the department of health officials stressed the danger, the more they bred a fear not only of the disease but of associating with those who had it. By 1903 this fear earned its own sobriquet: phthisiophobia."[13] It was often thought necessary to justify the exercise of

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an early stage of its development, precautions had not produced dramatic results and recommended treatments were frequently impractical and ineffective."); Sheila M. Rothman, *Seek and Hide: Public Health Departments and Persons with Tuberculosis, 1890-1940*, 21 J L Med & Ethics 289, 290-91 (1993) (During the decade beginning in 1894, the New York City Health Department published up to fifty thousand educational pamphlets on tuberculosis in many different languages. Yet the Department "also advocated a second and very different type of policy that looked to direct instruction and supervision of persons with tuberculosis in order to alter their behavior.").

9. Sheila Rothman documents the ascendancy of science in the late nineteenth century that substantially influenced tuberculosis policy: "And prestige bred authority. Although diagnostic capabilities far out-stripped therapeutic effectiveness, physicians and their prescriptions gained new stature both in the examining room and in the community." Rothman, *Living in the Shadow* at 180 (cited in note 5).

10. Rothman, 21 J L Med & Ethics at 291-92.

11. C. E. A. Winslow, *The Life of Hermann Biggs* 158 (Lea & Febiger, 1929).

12. S. Adolphus Knopf, *Tuberculosis as a Disease of the Masses and How to Combat It* (1903), in Rothman, *Living in the Shadow* at 184.

13. Rothman, *Living in the Shadow* at 190. *Phthisis* was the term for a particular

compulsory state powers by attributing wrongful conduct to persons with tuberculosis. "Public nuisance," "undesirable," and "fractious and intractable," were some of the early labels used at the turn of the century; persons with tuberculosis were "homeless, friendless, dependent, dissolute, dissipate, and vicious consumptives . . . likely to be most dangerous to the community."[14] Terms such as "recalcitrant," "non-compliant," and "non-adherent" are preferred today, but they have largely the same pejorative meaning and are usually associated with the use of compulsion.

A host of compulsory measures to combat the spread of tuberculosis can be documented from the mid-1890s, beginning almost directly after Koch's discovery of the causative agent of tuberculosis. The scope of state interventions was wide and included case identification (mandatory testing, physical examinations, reporting, tuberculosis registries, and contact tracing), disinfection or closure of premises, confinement (isolation and civil commitment), and criminal prosecutions for endangering the public.[15] In some instances, child custody was taken away from parents exposed to tubercle bacilli.[16] Public health officials argued that these powers constituted a valid exercise of the police power. Health departments even considered, but did not adopt, a policy of restricting interstate travel by persons who desired to travel west for a more healthful climate.[17] The biological revolution of antibiotics in the latter half of this century resulted in policies of compulsory treatment and of directly observed therapy.[18] Indeed, the biology of tuberculosis has placed this disease as the very archetype for compulsory state interventions for the benefit of the individual and the wider community.

This Article uses tuberculosis as the paradigm for exploring rational standards for the exercise of compulsory public health powers. Extant doctrine in disability and constitutional law provides a lens for examining judicial review of state interventions. First, I set out the central epidemiological and biological aspects of tuberculosis to demonstrate the strength of the governmental interest in curtailing the epidemic. Second, I examine the interventions of testing, screening, and confinement of persons with tuberculosis. Here, I focus on two congregate settings—correctional and health care facilities—that

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kind of consumption—pulmonary consumption. See Chapin, *What Changes?* (cited in note 2).

14. Rothman, *Living in the Shadow* at 192-93 (cited in note 5).

15. See Lawrence O. Gostin, *Controlling the Resurgent Tuberculosis Epidemic: A 50-State Survey of TB Statutes and Proposals for Reform*, 269 JAMA 255 (1993).

16. *Powell v Woolfolk*, 233 Ark 893, 349 SW2d 657 (Ark 1961) (holding that a change in custody was warranted because mother had married a man with tuberculosis).

17. See John E. Baur, *The Health Seekers of Southern California, 1870-1900* 150-73 (Huntington Library, 1959).

18. See Nancy Neveloff Dubler, et al, *Tuberculosis in the 1990s: Ethical, Legal and Public Policy Issues in Screening, Treatment, and the Protection of Those in Congregate Facilities: A Report from the Working Group on TB and HIV*, in *The Tuberculosis Revival: Individual Rights and Societal Obligation in a Time of AIDS* 1 (United Hosp Fund NY, 1992).

present substantial health risks and are principal foci for the exercise of state intervention. Third, I examine the exercise of traditional public health powers of detention, compulsory treatment, and directly observed therapy. Here, I discuss several conceptual dilemmas that continue to thwart scholars and the judiciary relating to the appropriate boundaries for governmental intervention. I conclude by arguing that, while the exercise of compulsion targeted against the individual remains a necessary component of disease control, it has been over-emphasized in scholarly discourse and case law. I advance the argument that government ought to be more concerned with aggregate changes in behavior among populations, which, paradoxically, is achieved not by focusing on the actions of individuals, but on broad policies of the state. Accordingly, thoughtfully crafted state programs for education and counselling and economic and social incentives for treatment stand the best chance of curtailing tuberculosis, and other ancient and emerging communicable diseases.

I. Scientific Aspects of Tuberculosis

A. EPIDEMIOLOGY

The biological and epidemiological realities of infectious diseases significantly influence legal and social thought about the power of the state to intervene to protect the public health. Despite the enticing promise of microbiological identification, prevention, and treatment, the burden of tuberculosis, particularly in the developing world, is formidable. Some forty years after the introduction of an effective chemotherapy, the tuberculosis pandemic is still one of the world's most pressing public health problems.[19] Tuberculosis is the leading cause of death associated with infectious diseases globally.[20]

While the disease has progressed almost unabated in many parts of the world, industrialized countries in North America[21] and Europe[22] have experi-

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19. See generally George W. Comstock and George M. Cauthen, *Epidemiology of Tuberculosis*, in Lee B. Reichman and Earl S. Hershfield, eds, *Tuberculosis: A Comprehensive International Approach* 23 (Marcel Dekker, 1993); Centers for Disease Control and Prevention, *Estimates of Future Global Tuberculosis Morbidity and Mortality*, 42 Morbid & Mortal Wkly Rep 961 (1993).

20. It is estimated that 1.7 billion persons, one out of every three people in the world, are infected with M. TB. Approximately 2.9 million deaths are attributable to the disease each year. In total, from 1993 through the end of the decade, nearly ninety million new tuberculosis cases and thirty million deaths are expected to occur if governments do not utilize the biological and social interventions available. See Paul J. Dolin, Mario C. Raviglione, and Arata Kochi, *A Review of Current Epidemiological Data and Estimation of Future Tuberculosis Incidence and Mortality* (WHO, 1993); Centers for Disease Control and Prevention, 42 Morbid & Mortal Wkly Rep 961; World Health Organization, *TB: A Global Emergency* 2 (1993); World Health Organization, *Treatment of Tuberculosis* at 1 (cited in note 4); World Health Organization, *Tuberculosis Notification Update* (1994).

21. See generally Hans L. Rieder, et al, *Epidemiology of Tuberculosis in the United States*, 11 Epidem Rev 79 (1989); M. Miles Braun, Timothy R. Cote, and Charles S. Rabkin, *Trends in Death with Tuberculosis during the AIDS Era*, 269 JAMA 2865

enced substantial declines in the burden of tuberculosis. The United States experienced an annual decline in cases of tuberculosis by an average of 5.6% per year from 1953 to 1985.[23] The long standing annual decline in the number of cases in the United States led the Department of Health and Human Services to establish an Advisory Council for the Elimination of Tuberculosis (ACET) in 1987.[24] When ACET was established in 1987 it was assumed that TB was a "[p]reventable, curable, but largely forgotten"[25] disease that realistically could be eliminated by the target year of 2010.[26] Yet, even before the ACET was established, the decline in tuberculosis had ended.[27] From the period 1985 through 1993, the number of reported cases exceeded by more than sixty-four thousand the predicted number, which was based on the trend of decline from 1980 through 1984.[28] In 1993, there were 25,313 reported cases of tuberculosis

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(1993).

22. See World Health Organization, *A Global Emergency* at 2 (cited in note 20).

23. See John A. Jereb, et al, *Tuberculosis Morbidity in the United States: Final Data, 1990*, 40 Morbid & Mortal Wkly Rep 23 (1991); Laurence Slutsker, et al, *Epidemiology of Extrapulmonary Tuberculosis among Persons with AIDS in the United States*, 16 Clin Infect Dis 513 (1993). The annual number of cases of TB in the U.S. decreased from 84,304 in 1953 to 22,255 in 1983, an absolute reduction of 73.6% and a rate reduction of 82.3%. Neil M. H. Graham and Richard E. Chaisson, *Tuberculosis and HIV Infection: Epidemiology, Pathogenesis, and Clinical Aspects*, 71 Annals Allergy 421 (1993).

24. Advisory Council for the Elimination of Tuberculosis, *A Strategic Plan for the Elimination of Tuberculosis in the United States*, 38 Morbid & Mortal Wkly Rep 1 (1989).

25. Marsha F. Goldsmith, *Forgotten (Almost) but Not Gone, Tuberculosis Suddenly Looms Large on Domestic Scene*, 264 JAMA 165 (1990).

26. In April 1989, the Secretary of Health and Human Services, Louis Sullivan, reiterated the goal of eliminating tuberculosis in the United States by the year 2010. Centers for Disease Control and Prevention, *Core Curriculum on Tuberculosis* 5 (2d ed, 1991). His statement was both unrealistic and disingenuous. To forecast the rapid elimination of tuberculosis was to suggest that a disease that had survived for a millennium could be eradicated in under two decades. More importantly, while the number of cases in the United States was declining overall, the disease continued to burden poor urban communities virtually unabated. See generally Victor W. Sidel, Ernest Drucker, and Steven Martin, *The Resurgence of Tuberculosis in the United States: Societal Origins and Societal Responses*, 21 J L Med & Ethics 303 (1993).

27. The decline in tuberculosis had similarly ended in other developed countries from 1987 onwards. See Centers for Disease Control and Prevention, *Tuberculosis—Western Europe, 1974-1991*, 42 Morbid & Mortal Wkly Rep 628 (1993); World Health Organization, *A Global Emergency* at 2 (cited in note 20) (finding that the incidence of tuberculosis in Spain, Italy, and Norway had increased between twenty-one percent and twenty-eight percent). The rate of increase in several of the poorer parts of Eastern Europe and the former Soviet Union was greater. See Mario C. Raviglione, et al, *Tuberculosis Trends in Eastern Europe and the Former USSR* (WHO, 1994).

28. Centers for Disease Control and Prevention, *Expanded Tuberculosis Surveillance and Tuberculosis Morbidity—United States, 1993*, 43 Morbid & Mortal Wkly Rep 361 (1994). See also Centers for Disease Control and Prevention, *Tuberculosis Morbidity—United States, 1992*, 42 Morbid & Mortal Wkly Rep 696 (1993). The incidence of TB in the U.S. rose 15.5% from 1984 to 1991. See Graham and Chaisson, 71 Annals Allergy at 421.

(9.8 cases per hundred thousand),[29] and it is estimated that some ten to fifteen million Americans are infected with M. TB, roughly seven percent of the population.[30] Active tuberculosis is the cause of approximately eighteen hundred to twenty thousand deaths per year.[31] In some parts of the United States the rise in cases was more pronounced. In New York City, for example, tuberculosis rates doubled in the decade beginning in 1980;[32] these rates approached the incidence of tuberculosis in parts of sub-Saharan Africa.[33] The distribution of the disease among the population is strikingly unequal, with substantially greater numbers of poor persons and ethnic minorities affected by the epidemic.[34]

B. STAGES OF TUBERCULOSIS

Tuberculosis is caused by Mycobacterium tuberculosis (M. TB) or tubercle bacilli.[35] Infection with M. TB occurs when tubercle bacilli enter the airways of

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29. Centers for Disease Control and Prevention, 43 Morbid & Mortal Wkly Rep at 361 (cited in note 28). This is, in fact, a slight decrease from the 26,673 cases of tuberculosis (10.5 cases per one hundred thousand people) in 1992. See Centers for Disease Control and Prevention, 42 Morbid & Mortal Wkly Rep at 696 (cited in note 28). See also Centers for Disease Control and Prevention, *Tuberculosis Statistics in the United States 1992* (US Dept of Health and Human Serv, 1994); Centers for Disease Control and Prevention, *Tuberculosis Statistics in the United States 1991* (US Dept of Health and Human Serv, 1993); Centers for Disease Control and Prevention, *Tuberculosis Statistics in the United States 1990* (US Dept of Health and Human Serv, 1992).

30. See Centers for Disease Control and Prevention, *Core Curriculum* at 7 (cited in note 26); Centers for Disease Control and Prevention, *Screening for Tuberculosis and Tuberculosis Infection in High-Risk Populations: Recommendations of the Advisory Committee for the Elimination of Tuberculosis*, 39 Morbid & Mortal Wkly Rep 1 (1990).

31. See Centers for Disease Control and Prevention, *Tuberculosis Statistics in the United States 1992* at 51; H. B. Simon, *Infections Due to Gram-Positive Cocci*, 7 Sci Am Med 1 (1991).

32. See Peter A. Selwyn, *Tuberculosis in the AIDS Era: A New Threat from an Old Disease*, 91 NY St J Med 233 (1991).

33. See Peter F. Barnes and Susan A. Barrows, *Tuberculosis in the 1990s*, 119 Annals Internal Med 400, 401 (1993).

34. Approximately seventy percent of all cases and eighty-six percent of those among children occur among African Americans and Latinos. Centers for Disease Control and Prevention, *Prevention and Control of Tuberculosis in U.S. Communities with At-Risk Minority Populations: Recommendations of the Advisory Council for the Elimination of Tuberculosis*, 41 Morbid & Mortal Wkly Rep 1 (1992).

35. *Mycobacterium* is the name of the bacterial family that causes tuberculosis and other infectious diseases in humans and animals. The complex of mycobacterial species that cause tuberculosis includes *M. tuberculosis* (which is by far the most common cause of TB), *M. bovis*, and *M. africanum*. See American Thoracic Society, *Control of Tuberculosis in the United States*, 146 Am Rev Respir Dis 1623, 1631 (1992). Earlier this century, *M. bovis*, which causes TB in cattle, was transmitted to human beings through unpasteurized milk and respiratory exposure to infected cattle, but it now accounts for less than one percent of human TB cases in North America. See Centers for Disease Control and Prevention, *Bovine Tuberculosis—Pennsylvania*, 39 Morbid & Mortal Wkly Rep 201, 202 (1990); US Congress, Office of Technology Assessment, *The Continuing Challenge of Tuberculosis* 27 (GPO, 1993); Jerrold J. Ellner, *Current Issues in Tuberculosis*, 123 J Lab

a noninfected person and lodge in the lungs. The bacilli multiply slowly and usually do not cause noticeable symptoms. The infection in the lungs is usually well established before the body's immune system begins to mount an effective response. After six to eight weeks, the body begins to produce white blood cells that seek out the bacilli. At this point the standard screening test for tuberculosis, the tuberculin skin test, purified protein derivative (PPD), becomes positive.[36] In the great majority of cases the body's immune response successfully kills all but a small number of tubercle bacilli and the disease enters a dormant or latent stage of extremely variable length. During this dormant period, individuals, though still infected with M. TB, are normally not contagious to others if they do not evidence clinically active pulmonary or laryngeal disease.[37]

Immunocompetent persons,[38] unless successfully treated with preventive anti-TB drug therapy, have approximately a ten percent lifetime risk of developing active disease after a variable period of dormancy.[39] Primary M. TB infection progresses directly to active disease within a year after infection—referred to as progressive primary tuberculosis—in about three to five percent of cases.[40] After the first year, infected individuals face a five percent to seven percent lifetime risk that the existing infection will reactivate and they will develop active disease.[41] In persons with reactivated tuberculosis, the tubercle bacilli that have remained dormant for years begin to multiply and cause damage to the infected area.[42] It is not known why reactivation of long-dormant infection occurs in some individuals and not in others,[43] but it may be related to a decline in overall health,[44] loss of immune function, or reinfection with M. TB.[45]

& Clin Med 478 (1994); Charles A. Peloquin and Shaun E. Berning, *Infection Caused by* Mycobacterium Tuberculosis, 28 Annals Pharmacotherapy 72 (1994).

36. See text accompanying notes 60-66.

37. See Centers for Disease Control and Prevention, *Core Curriculum* at 10 (cited in note 26).

38. Persons with impaired immune systems such as individuals with HIV infection are at substantially greater risk of developing clinical disease after being infected with M. TB. See text accompanying notes 75-86.

39. Pulmonary tuberculosis is the most common form of the disease. Symptoms may include loss of appetite, weight loss, fatigue, fevers, and night sweats, accompanied by a chronic cough or a cough containing mucus streaked with blood.

40. See H. William Harris, *Pulmonary Tuberculosis*, in P. D. Hoeprich and M. C. Jordan, eds, *Infectious Diseases* 405, 410 (Lippincott, 4th ed 1989).

41. See Peter A. Selwyn, et al, *A Prospective Study of the Risk of Tuberculosis among Intravenous Drug Users with Human Immunodeficiency Virus Infection*, 320 New Eng J Med 545 (1989).

42. H. B. Simon, *Infections Due to* Mycobacteria, in Edward Rubenstein and Daniel D. Federman, eds, 7 Sci Am Med 1, 4 (1991).

43. See Donald E. Kopanoff, Dixie E. Snider, Jr., and Martha Johnson, *Recurrent Tuberculosis: Why Do Patients Develop Disease Again? A United States Public Health Service Cooperative Survey*, 78 Am J Pub Health 30 (1988).

44. See Harris, *Pulmonary Tuberculosis* at 422.

45. The possibility of reinfection may increase in persons with deteriorating immune systems (e.g., elderly or HIV-infected persons) or in those exposed to very high levels of infectious droplets (e.g., residents or workers in crowded shelters, prisons, hospitals, and

C. MULTIDRUG-RESISTANT TUBERCULOSIS

Ever since the time that antibiotics became available for tuberculosis, physicians have recognized that some cases are resistant to treatment. Over the decades, however, an increasing proportion of patients have become resistant to medication, and treatment of patients with resistant strains of M. TB has become ever more challenging. There are two ways a patient can develop drug-resistant tuberculosis. Transmitted or primary drug resistance occurs when a person becomes infected with M. TB organisms that are already resistant to one or more drugs. In these cases, the drug-resistant strain is passed directly to previously uninfected individuals in whom the standard therapy will fail. Acquired or secondary drug resistance occurs when the small number of drug-resistant mutants are selected as a result of ineffective anti-tuberculosis therapy. If persons with tuberculosis take their medication in an incomplete or sporadic fashion (e.g., erratic drug ingestion or omission of one or more of the prescribed agents), if there is an insufficient number of drugs in the regimen, or if the dosage is suboptimal, hardy bacilli survive and can go on to multiply and produce drug-resistant active disease within months.[46]

While drug resistance is not new,[47] the prevalence of multidrug-resistant tuberculosis (MDR-TB) has increased significantly since the mid-1980s.[48] From 1982 through 1986, the proportion of new cases resistant to both isoniazid and rifampin was only 0.5 percent.[49] Several hundred cases of tuberculosis resistant to at least two of the front-line drugs have been identified in thirteen states during the last three years.[50] Among these cases were many that were resistant to seven drugs, including all five front-line drugs.[51] Large outbreaks of MDR-TB have occurred in both Florida and New York.[52]

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other congregate settings). See E. Nardell, et al, *Exogenous Reinfection with Tuberculosis in a Shelter for the Homeless*, 315 New Eng J Med 1570 (1986).

46. See Michael D. Iseman, *Treatment of Multidrug-Resistant Tuberculosis*, 329 New Eng J Med 784 (1993).

47. See Gladys L. Hobby, *Primary Drug Resistance in Tuberculosis*, 86 Am Rev Respir Dis 839 (1962); Marian Goble, *Drug-Resistant Tuberculosis*, 33 Semin Respir Infect 220 (1986); Georges Canetti, *Present Aspects of Bacterial Resistance in Tuberculosis*, 92 Am Rev Respir Dis 687 (1965); Rick Weiss, *On the Track of "Killer" TB*, 255 Sci 148 (1992).

48. Centers for Disease Control and Prevention, *Meeting the Challenge of Multidrug-Resistant Tuberculosis: Summary of a Conference*, 41 Morbid & Mortal Wkly Rep 51 (1992). See also Jeanne Kassler, *Drug-Resistant Tuberculosis Is Surging*, NY Times 1, 8 (June 2, 1991).

49. Centers for Disease Control and Prevention, *Tuberculosis Control Laws—United States, 1993*, 42 Morbid & Mortal Wkly Rep 1, 2 (1993).

50. See Dixie E. Snider, Jr., and William L. Roper, *The New Tuberculosis*, 326 New Eng J Med 703 (1992).

51. Id at 704.

52. Centers for Disease Control and Prevention, *Nosocomial Transmission of Multiple-Drug-Resistant Tuberculosis among HIV-Infected Persons—Florida and New York 1988-*

In 1991, a national survey of MDR-TB found that 14.2 percent of cases were resistant to at least one drug, and 3.5 percent were resistant to both isoniazid (INH) and rifampin (RIF), the most effective drugs.[53] While MDR-TB was found in thirteen states, New York City accounted for 61.4 percent of the nation's MDR-TB cases.[54] A 1992 survey in New York City found that thirty-two to thirty-six percent of cases had organisms resistant to at least one anti-tuberculosis drug, and nineteen percent had organisms resistant to INH and RIF.[55] This resistance lengthens the course of treatment from six months to eighteen to twenty-four months, greatly increases the cost of treatment,[56] and decreases the cure rate from nearly one hundred percent to forty to sixty percent.[57] The fatality rate for tuberculosis resistant to two or more major antibiotics is equivalent to untreated tuberculosis.[58] Patients with drug-resistant organisms have a eighty-three-fold greater rate of treatment failure, and a two-fold greater rate of relapse than those with drug susceptible tuberculosis.[59]

1991, 40 Morbid & Mortal Wkly Rep 585 (1991); Centers for Disease Control and Prevention, *Outbreak of Multiple-Drug-Resistant Tuberculosis at a Hospital—New York City, 1991*, 42 Morbid & Mortal Wkly Rep 427 (1993). See also Geoffrey Cowley, Elizabeth Ann Leonard, and Mary Hager, *Tuberculosis: A Deadly Return*, Newsweek 53, 56 (Mar 16, 1992).

53. Alan B. Bloch, et al, *Nationwide Survey of Drug-Resistant Tuberculosis in the United States*, 271 JAMA 665 (1994). See also National MDR-TB Task Force, *National Action Plan to Combat Multidrug-Resistant Tuberculosis* (1992).

54. Bloch, et al, 271 JAMA at 667.

55. Thomas R. Frieden, et al, *The Emergence of Drug-Resistant Tuberculosis in New York City*, 328 New Eng J Med 521 (1993). See also National MDR-TB Task Force, *National Action Plan*; Dale L. Morse, *Multidrug Resistance: The New York Experience*, in D. H. Porter and Keith P. W. J. McAdam, eds, *Tuberculosis: Back to the Future* 225 (John Wiley & Sons, 1994). Several other large pockets of MDR-TB have been reported in large urban areas. For example, one hospital in Los Angeles found that twenty-three percent of TB patients with no prior treatment had resistant organisms and fifty-nine percent of TB patients with a history of prior treatment had resistant organisms. Gregory R. Ben-Dov and Issacher Mason, *Drug-Resistant Tuberculosis in a Southern California Hospital: Trends from 1969 to 1984*, 135 Am Rev Respir Dis 1307 (1987). See also Iseman, 329 New Eng J Med at 785 (cited in note 46).

56. See Peter S. Arno, et al, *The Economic Impact of Tuberculosis in Hospitals in New York City: A Preliminary Analysis*, 21 J L Med & Ethics 317 (1993).

57. See Iseman, 329 New Eng J Med at 784; Snider and Roper, 326 New Eng J Med at 703 (cited in note 50); Marian Goble, et al, *Treatment of 171 Patients with Pulmonary Tuberculosis Resistant to Isoniazid and Rifampin*, 328 New Eng J Med 527 (1993); Centers for Disease Control and Prevention, 42 Morbid & Mortal Wkly Rep at 2 (cited in note 49). See also Centers for Disease Control and Prevention, *Initial Therapy for Tuberculosis in the Era of Multidrug Resistance: Recommendations of the Advisory Council for the Elimination of Tuberculosis*, 42 Morbid & Mortal Wkly Rep 1 (1993).

58. Barry R. Bloom and Christopher J. L. Murray, *Tuberculosis: Commentary on a Reemergent Killer*, 257 Sci 1055, 1056 (1992).

59. See Iseman, 329 New Eng J Med at 785.

D. TESTING AND DIAGNOSIS

Tuberculin skin testing is the standard method of identifying persons infected with M. TB. The Mantoux test, the tuberculin skin test, uses an injection into the skin of purified protein derivative (PPD).[60] "Anergy" is the inability to mount an immune response to a skin-test antigen as a result of immunosuppression. Anergic individuals, including some persons who are elderly, have advanced disease, or have HIV infection, may have lost the ability to react to the PPD because of the declining effectiveness of their immune systems.[61] Anergic individuals infected with M. TB may falsely test negative with the PPD skin test.

Infection with clinically active tuberculosis is established by a patient history and clinical examination, tuberculin skin testing, radiographic examination,[62] and demonstration of mycobacteria.[63] Detection of acid-fast bacilli (AFB)[64] through microscopic examination of stained smears can provide the first bacteriologic clue of tuberculosis soon after infection but is not conclusive since it may reveal only non-tuberculous mycobacteria or no bacteria at all due to the small number of tubercle bacilli in some sputum samples. It normally takes three to six weeks to culture the sputum to confirm the diagnosis. Conventional methods for determining if the mycobacterium are drug-resistant require eight to twelve weeks.[65] However, the newer radiographic techniques can test for susceptibility to front line drugs in about three weeks.[66]

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60. See J. A. Lunn and A. S. Johnson, *Comparison of the Tine and Mantoux Tuberculin Tests: Report of the Tuberculin Subcommittee of the Research Committee of the British Thoracic Association*, 1 Br Med J 1451 (1978); Centers for Disease Control and Prevention, *Core Curriculum* at 11-15 (cited in note 26).

61. See Simon, 7 Sci Am Med at 4 (cited in note 31). While anergy often occurs in persons infected with HIV, other diseases or conditions can also cause suppression of cellular immunity such as viral infections (measles, mumps, chickenpox), bacterial infections (typhoid fever, pertussis, leprosy, overwhelming tuberculosis), diseases affecting lymphoid organs (Hodgkin's disease, lymphoma), age (newborn or elderly), or stress (surgery, burns).

62. Pulmonary tuberculosis often results in the formation of a cavity and progressive deterioration of the lungs that can be detected through a chest radiograph. Abnormalities on chest radiographs may be suggestive of, but are never diagnostic for, tuberculosis because many other diseases produce similar or identical-looking images. Centers for Disease Control and Prevention, *Core Curriculum* at 24 (cited in note 26).

63. Laboratory examination of sputum or other clinical specimens for the presence of M. TB is the gold standard for confirmation of clinically active disease. See id at 21-24; American Thoracic Society, *Diagnostic Standards and Classification of Tuberculosis*, 142 Am Rev Respir Dis 725 (1990).

64. Acid-fast bacilli are defined as "[o]rganisms that retain certain stains even after being washed with acid alcohol. Most are mycobacteria. When seen on a stained smear of sputum or other clinical specimen, a diagnosis of tuberculosis should be considered." US Congress, Office of Technology Assessment, *Continuing Challenge* at 113 (cited in note 35).

65. See Margarita E. Villarino, Lawrence J. Geitner, and Patricia M. Simone, *The Multidrug-Resistant Tuberculosis Challenge to Public Health Efforts to Control Tuberculosis*, 107 Pub Health Reps 616 (1992).

66. See US Congress, Office of Technology Assessment, *Continuing Challenge* at 71

The extended length of time needed to determine whether an individual has clinically active disease susceptible to treatment poses formidable difficulties in decisions about treatment and isolation of patients. The uncertainty affects clinical decisionmaking about whether and how to treat. Just as important is the policy choice of whether to detain the person and for how long. Until laboratory results are available, it is difficult to determine whether and when, a person undergoing treatment will be rendered non-infectious.

E. TRANSMISSION

Tuberculosis is spread primarily by airborne droplets (droplet nuclei) produced by a person with clinically active tuberculosis of the lungs or larynx. Droplet nuclei remain suspended in air for prolonged periods and are rapidly distributed by interior air currents and ventilation systems. Droplet nuclei, therefore, remain a potential source of infection within indoor environments until they are removed, diluted, or otherwise inactivated.[67]

Persons with asymptomatic M. TB infection are not contagious. Further, persons with active clinical tuberculosis are contagious only they actually expel airborne particles containing viable tubercle bacilli—for example, through coughing, sneezing, talking, or singing.[68] Tuberculosis is usually contagious only if it is manifested in the lungs (pulmonary TB) or, rarely, in the larynx. Thus, persons with extrapulmonary tuberculosis without any lung or airway involvement do not pose a risk of infection to others. More importantly, adequate antimicrobial treatment can quickly reduce and eventually eliminate contagiousness in individuals with drug-susceptible tuberculosis.[69] Persons with MDR-TB may remain infectious for prolonged periods until an effective regimen of drugs is determined and administered. Persons with untreatable forms of tuberculosis may remain indefinitely contagious.[70]

While the media has created fear of casual transmission in crowded spaces such as subways, airplanes, or movie theaters,[71] M. TB infection in these venues, while possible,[72] is not likely. Tuberculosis is not as contagious as many airborne viral infections, such as varicella (chicken pox) and measles.[73] The key

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(cited in note 35).

67. American Thoracic Society, 146 Am Rev Respir Dis at 1627 (cited in note 35).

68. See US Congress, Office of Technology Assessment, *Continuing Challenge* at 28.

69. See Robert C. Noble, *Infectiousness of Pulmonary Tuberculosis after Starting Chemotherapy*, 9 Am J Infect Control 6 (1981).

70. See US Congress, Office of Technology Assessment, *Continuing Challenge* at 29.

71. See, for example, Joseph A. Califano, Jr., *Three-Headed Dog from Hell: The Staggering Public Health Threat Posed by AIDS, Substance Abuse and Tuberculosis*, Wash Post A21 (Dec 21, 1992) (TB is a highly contagious, deadly disease that "you can catch from the person next to you in a movie theater or classroom.").

72. See Bloom and Murray, 257 Sci 1055 (cited in note 58).

73. See Edward A. Nardell, *Dodging Droplet Nuclei: Reducing the Probability of Nosocomial Tuberculosis Transmission in the AIDS Era*, 142 Am Rev Respir Dis 501 (1990); US Congress, Office of Technology Assessment, *Continuing Challenge* at 28 (cited

factors influencing the probability of acquiring M. TB infection are closeness of contact with a contagious person, duration of contact, and environmental conditions.[74] Those at greatest risk of contracting the infection are family members, residents and staff of residential facilities, and others who are living or working together in a confined space for an extended period of time.

F. The Interconnected Epidemics of HIV and M. TB

There exists a powerful interconnection between HIV infection and M. TB—both epidemiologically and clinically. Epidemiologic observations have led investigators to believe that the majority of the excess tuberculosis cases in the United States are attributable to HIV disease.[75] The HIV epidemic has fueled the resurgence of tuberculosis, particularly in major urban areas such as New York, where there has been a dramatic rise in hospitalizations associated with co-infection compared to those associated with tuberculosis alone.[76] The rate of

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in note 35).

74. US Congress, Office of Technology Assessment, *Continuing Challenge* at 28-29.

75. The following epidemiologic evidence suggests that the HIV epidemic has significantly contributed to the increase in the reported cases of tuberculosis. First, geographic areas with the highest burden of HIV disease have had the greatest increases in tuberculosis. See Centers for Disease Control and Prevention, 43 Morbid & Mortal Wkly Rep at 363 (cited in note 28); US Congress, Office of Technology Assessment, *Continuing Challenge* at 35-36; Centers for Disease Control and Prevention, *Tuberculosis and Acquired Immunodeficiency Syndrome—New York City*, 36 Morbid & Mortal Wkly Rep 785 (1987); Centers for Disease Control and Prevention, *Tuberculosis and Acquired Immunodeficiency Syndrome—Florida*, 35 Morbid & Mortal Wkly Rep 587 (1986). Second, the demographic groups with the highest prevalence of HIV disease (African Americans and Hispanics twenty-five to forty-four years old) have had the greatest increases in tuberculosis. See William W. Stead, et al, *Racial Differences in Susceptibility to Infection by* Mycobacterium *Tuberculosis*, 322 New Eng J Med 422 (1990); Dixie E. Snider, Louis Salinas, and Gloria D. Kelly, *Tuberculosis: An Increasing Problem among Minorities in the United States*, 104 Pub Health Reps 646 (1989). Third, rates of extrapulmonary tuberculosis have risen by twenty percent during this period, compared with increases of three percent for pulmonary tuberculosis, apparently reflecting the high frequency of extrapulmonary tuberculosis in persons with AIDS. See Slutsker, et al, 16 Clin Infect Dis at 513 (cited in note 23); Graham and Chaisson, 71 Annals Allergy at 421-23 (cited in note 23). See also Peter F. Barnes, et al, *Tuberculosis in Patients with Human Immunodeficiency Virus Infection*, 324 New Eng J Med 1644 (1991); Selwyn, 21 J L Med & Ethics at 280-83 (cited in note 4); Richard E. Chaisson, et al, *Tuberculosis in Patients with the Acquired Immunodeficiency Syndrome*, 136 Am Rev Respir Dis 570 (1987); Gnana Sunderam, et al, *Tuberculosis as a Manifestation of the Acquired Immunodeficiency Syndrome (AIDS)*, 256 JAMA 362 (1986); Braun, Cote, and Rabkin, 269 JAMA 2865 (cited in note 21).

76. See Arno, et al, 21 J L Med & Ethics at 319 (cited in note 56) (TB /HIV hospitalizations increased by 4,216%, in contrast to an increase of seventy-six percent for TB /HIV- hospitalizations from 1983 to 1990.). See also Margaret A. Hamberg, *Rebuilding the Public Health Infrastructure: The Challenge of Tuberculosis Control in New York City*, 21 J L Med & Ethics 352 (1993); Stephen C. Joseph, *New York City, Tuberculosis, and the Public Health Infrastructure*, 21 J L Med & Ethics 372 (1993).

new cases of tuberculosis among persons with AIDS is almost five hundred times that of the general population.[77]

Many clinicians have long believed that persons with HIV infection are at increased risk of contracting M. TB infection following exposure.[78] Recent investigations of outbreaks of tuberculosis in congregate settings strongly support the clinical perception that persons with HIV are significantly more susceptible to M. TB infection.[79]

There is considerable evidence, moreover, that once an HIV infected person contracts the M. TB infection, he or she faces an extraordinarily high risk of developing clinically active tuberculosis. As indicated above, only ten percent of persons with undamaged immune systems who are infected with M. TB are likely ever to develop active disease. Persons dually infected with HIV and M. TB have an eight to ten percent risk *per year* of developing active disease.[80] Accordingly, persons with HIV disease are forty times more likely to progress to active tuberculosis following M. TB infection than persons who are not HIV infected. Virtually all dually infected patients will progress to active disease if they live long enough. Further, some HIV-infected persons who contract M. TB infection experience an accelerated progression to active tuberculosis[81] and have a distressing prognosis.[82]

More troubling still is the increased propensity of dually infected persons to have a drug resistant strain of M. TB. Some ninety percent of the cases of MDR-TB identified by the Centers for Disease Control and Prevention in the last two years have been in persons with HIV infection. Persons with AIDS who are infected with MDR-TB have an extremely poor prognosis; seventy to ninety percent die from TB, and half of those victims die within sixteen weeks.[83] The damage to the immune system caused by HIV makes the PPD skin test unreliable.[84] In studies, twenty-five to fifty percent of otherwise healthy persons with HIV infection who carry tubercle bacilli do not react to a PPD skin test. In persons whose HIV infection has progressed to clinical AIDS, this number is fifty to seventy-five percent.[85] Problems with scientific identification of M. TB can lead

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77. See Barnes, et al, 324 New Eng J Med at 1644 (cited in note 75).

78. See Selwyn, 21 J Law Med & Ethics at 281 (cited in note 4).

79. See Graham and Chaisson, 71 Annals Allergy at 425 (cited in note 23); Charles L. Daley, et al, *An Outbreak of Tuberculosis with Accelerated Progression among Persons Infected with the Human Immunodeficiency Virus: An Analysis Using Restriction-Fragment-Length Polymorphisms*, 326 New Eng J Med 231 (1992); Giovanni DiPerri, et al, *Nosocomial Epidemic of Active Tuberculosis among HIV-Infected Patients*, 2 Lancet 1502 (1989).

80. See Selwyn, et al, 320 New Eng J Med at 545.

81. See Daley, et al, 326 New Eng J Med 231.

82. See id.

83. Snider and Roper, 326 New Eng J Med at 704 (cited in note 50).

84. See the discussion of anergy in the text accompanying notes 60-61.

85. See Harris, *Pulmonary Tuberculosis* at 433 (cited in note 40); Neil M. H. Graham, et al, *Prevalence of Tuberculin Positivity and Skin Test Anergy in HIV-1-Seropositive and -Seronegative Intravenous Drug Users*, 267 JAMA 369 (1992); Elisabeth Rosenthal, *HIV*

to legal problems when public health officials attempt to detect HIV infected persons who pose a significant risk of developing clinical disease and transmitting M. TB infection to others. Persons with HIV infection who live in crowded facilities are especially vulnerable to being infected, transmitting the infection, and becoming seriously ill before being diagnosed with tuberculosis. As a result, many clinicians are calling for a more aggressive approach to identification and management of dually infected persons, including routine (even compulsory) HIV screening, anergy testing, preventive treatment before a diagnosis of M. TB infection is made, and quarantine before a diagnosis of active disease is confirmed.[86]

G. Biological Interventions: Preventive and Curative Treatment

Biological interventions to prevent tuberculosis (both by vaccination[87] before infection and prophylactic treatment after infection) and to treat the disease have been prominent features of public health efforts since the middle part of the century.[88] It has long been possible to prevent or treat the great majority of cases of tuberculosis. Biological interventions are receiving renewed attention with the resurgence of tuberculosis, particularly of the drug-resistant forms of the disease.[89]

Isoniazid (INH) has been used since the 1950s on patients infected with M. TB to prevent the development of clinically active disease. Isoniazid preventive treatment (IPT) attempts to eliminate tubercle bacilli within the body to reduce significantly the risk of active disease.[90] Isoniazid administered to previously

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Infection Foiling Tests That Detect Deadly TB Germ, NY Times A1, C3 (Dec 10, 1991). However, HIV probably does not significantly compromise the diagnostic utility of the sputum smear. Richard Long, et al, *The Impact of HIV on the Usefulness of Sputum Smears for the Diagnosis of Tuberculosis*, 81 Am J Pub Health 1326 (1991).

86. See Rosenthal, NY Times at C3 (Dec 10, 1991); Ana Guelar, et al, *A Prospective Study of the Risk of Tuberculosis among HIV-Infected Patients*, 7 AIDS 1345 (1993) (Among HIV-infected patients in whom a PPD is negative, the risk of developing active TB is sufficient to consider prophylaxis if the CD4 count falls below 400.). See also Alvin Novick, *Resurgent Tuberculosis in HIV-Infected Persons*, 7 AIDS & Pub Pol J 3 (1992).

87. The Bacillus Calmette-Guerin vaccine (BCG) is the most widely used vaccine in the world, with more than three billion doses administered over the past forty years. See World Health Organization, *Expanded Programme on Immunization: Update* (May 1991). The efficacy of the vaccine in preventing disease, however, has not been proven. Ten major randomized clinical trials testing the BCG have failed to resolve the controversy surrounding its efficacy. Enormous variation in protective efficacy has been shown, ranging from zero (or negative) to eighty percent. See Graham A. Colditz, et al, *Efficacy of BCG Vaccine in the Prevention of Tuberculosis: Meta-Analysis of the Published Literature*, 271 JAMA 698 (1994).

88. For the microbiologic principles of antituberculosis therapy, see Jeffery R. Starke, *Multidrug Therapy for Tuberculosis in Children*, 9 Pediatric Infect Dis J 785 (1990).

89. See generally Peter F. Barnes and Susan A. Barrows, *Tuberculosis in the 1990s*, 120 Annals Internal Med 400 (1994).

90. See generally Richard J. O'Brien, *Preventive Therapy for Tuberculosis*, in Porter and McAdam, eds, *Back to the Future* at 151 (cited in note 55).

infected persons for six to twelve months has been demonstrated to be effective in fifty-four to ninety-three percent of adults[91] and nearly all children.[92] IPT is effective only if the M. TB infection is not resistant to INH.[93] The beneficial effects of IPT are thought to last a lifetime, barring reinfection.[94]

Before the advent of antimicrobial drugs in the 1940s, patients with tuberculosis suffered deeply with the disease. Descriptions of the pre-antibiotic era were evocative: "The cough in its early stages was 'frequent and harassing' and later developed into 'hollow rattles' and 'graveyard coughs.' An initial 'ruddiness' of the face gave way to a 'deathlike paleness'. . . . The mucous discharge changed color and texture from 'green' to 'blood streaked'; hemorrhages, measured by teaspoons and cupfuls, occurred more frequently."[95] Primitive treatments involved bed rest, fresh air, and surgery to remove parts of the lung. More than half of all individuals who developed clinical disease died.

From 1944, when Waksman first discovered streptomycin, to the introduction of isoniazid (INH)[96] and ethambutolin (EMB) in the 1950s, to the availability of rifampin (RIF) and rediscovery of pyrazinamide (PZA) in the 1960s and 1970s, science made ever greater progress in the treatment of tuberculosis. These five front-line drugs, taken consistently and in the correct combination, make it possible today to cure the vast majority of cases of drug-susceptible tuberculosis.[97] Second-line anti-TB drugs generally are less effective and more

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91. See William C. Bailey, et al, *Preventive Treatment of Tuberculosis: Report of the National Consensus Conference on Tuberculosis*, 87 Chest 128S (1985); S. H. Ferebee, *Controlled Chemoprophylaxis Trials in Tuberculosis: A General Review*, 26 Bibl Tuberc Med Thorac 28 (1970); International Union Against Tuberculosis Committee on Prophylaxis, *Efficacy of Various Durations of Isoniazid Preventive Therapy for Tuberculosis: Five Years of Follow-Up in the IUAT Trial*, 60 Bull WHO 555 (1982). The main reason for the variation in efficacy appears to be the amount of medication actually taken during the year in which INH was prescribed. Centers for Disease Control and Prevention, *The Use of Preventive Therapy for Tuberculous Infection in the United States: Recommendations of the Advisory Committee for Elimination of Tuberculosis*, 39 Morbid & Mortal Wkly Rep 9 (1990).

92. See Katherine H. K. Hsu, *Thirty Years after Isoniazid: Its Impact on Tuberculosis in Children and Adolescents*, 251 JAMA 1283 (1984); Starke, 9 Pediatric Infect Dis J at 785.

93. While it has not definitively been demonstrated to be effective, the use of rifampin (RIF) for prevention of tuberculosis is recommended if the infection is INH-resistant or the person cannot tolerate INH. See American Thoracic Society, *Treatment of Tuberculosis and Tuberculosis Infection in Adults and Children*, 134 Am Rev Respir Dis 355 (1986); Bailey, et al, 87 Chest at 128S.

94. See Claudia A. Hanson and Lee B. Reichman, *Tuberculosis Skin Testing and Preventive Therapy*, 4 Semin Respir Infect 182 (1989); US Congress, Office of Technology Assessment, *Continuing Challenge* at 55 (cited in note 35).

95. Rothman, *Living in the Shadow* at 4 (cited in note 5) (quoting William Sweetser, *Treatise on Consumption* 65 (TH Carter, 1836)). See also Bates, *Bargaining for Life* (cited in note 5).

96. Isoniazid was first synthesized in 1912 but sat on the shelf for forty years. Bloom and Murray, 257 Sci at 1056 (cited in note 58).

97. Debra L. Combs, Richard J. O'Brien, and Lawrence J. Geiter, *USPHS Tuberculosis*

toxic than the standard agents, but they may be very important in treating persons infected with strains that have developed resistance to some or all of the standard treatments and for patients experiencing severe side effects from the standard drugs.[98]

Remarkably, despite the global burden of tuberculosis, no new anti-TB drugs have been approved for general use since RIF was introduced in 1971. However, the emergence of drug-resistant strains and the rising rate of infection with multiple mycobacteria in patients with HIV disease have prompted renewed research. In the meantime, legal and policy discourse has centered around one overarching consideration: what means are effective and legally permissible to ensure behavioral compliance with the full recommended course of anti-tuberculosis treatment.

II. Compulsory Interventions in Congregate Facilities

In the last two decades, the routine tuberculosis screening of large populations of both adults and children in this country was abandoned.[99] However, the Mantoux test is still used for screening specific populations to identify infected persons at high risk of disease who would benefit from preventive therapy.[100] The Public Health Service recommends screening of a wide variety of groups, ranging from persons with impaired immune systems, drug- and alcohol-dependent persons, and immigrants, to persons with low income and residents of congregate settings.[101] State statutes require screening of a wide variety of population groups including employees of medical facilities, child care providers, correctional facility employees, school children, food handlers, and long-term care facility residents.[102]

Short-Course Chemotherapy Trial 21: Effectiveness, Toxicity, and Acceptability, 112 Annals Internal Med 397 (1990); East African/British Medical Research Council, *Results at 5 Years of a Controlled Comparison of a 6-Month and a Standard 18-Month Regimen of Chemotherapy for Pulmonary Tuberculosis*, 115 Am Rev Respir Dis 3 (1977); Michael D. Iseman and John A. Sbarbaro, *Short-Course Chemotherapy of Tuberculosis: Hail Britannia (and Friends)!*, 143 Am Rev Respir Dis 697 (1991). See American Thoracic Society, 146 Am Rev Respir Dis at 1623 (cited in note 35). Success rates for MDR-TB are considerably lower. See text accompanying notes 56-59.

98. See generally American Thoracic Society, 134 Am Rev Respir Dis 355 (cited in note 93).

99. US Congress, Office of Technology Assessment, *Continuing Challenge* at 55-56 (cited in note 35).

100. Anergy is usually assessed by testing with a panel of skin-test antigens to which most healthy people would be expected to react. Tests administered by the standard Mantoux technique are recommended whereby a small amount of antigen is injected into the forearm. See Centers for Disease Control and Prevention, *Purified Protein Derivative (PPD)-Tuberculin Anergy and HIV Infection: Guidelines for Anergy Testing and Management of Anergic Persons at Risk of Tuberculosis*, 40 Morbid & Mortal Wkly Rep 27 (1991).

101. Centers for Disease Control and Prevention, *Core Curriculum* at 11-12 (cited in note 26); Centers for Disease Control and Prevention, 39 Morbid & Mortal Wkly Rep at 1 (cited in note 30).

102. Centers for Disease Control and Prevention, *Tuberculosis Control Laws—United*

In this Section, I will focus on two settings in which widespread screening programs are conducted—correctional and health care facilities. However, these facilities are but examples of the many congregate settings that pose severe health risks and are prime candidates for screening. If one were to design facilities for the efficient transmission of airborne disease, one might well have selected the physical conditions and resident populations of congregate settings in America—hospitals,[103] nursing homes,[104] residential care homes,[105] mental institutions, correctional facilities,[106] homeless shelters,[107] Indian reservations,[108] and immigrant[109] and migrant worker[110] camps. In many of these settings,

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States, 1993: Recommendations of the Advisory Council for the Elimination of Tuberculosis (ACET), 42 Morbid & Mortal Wkly Rep 1, 22-23 (1993).

103. See, for example, David L. Horn, et al, *Fatal Hospital-Acquired Multidrug-Resistant Tuberculosis Pericarditis in Two Patients with AIDS*, 327 New Eng J Med 1816 (1992) (letter to the editor); Centers for Disease Control and Prevention, 40 Morbid & Mortal Wkly Rep 585 (cited in note 52); Centers for Disease Control and Prevention, *Guidelines for Preventing the Transmission of Tuberculosis in Health-Care Settings, with Special Focus on HIV-Related Issues*, 39 Morbid & Mortal Wkly Rep 1 (1990).

104. See William W. Stead, *Tuberculosis among Elderly Persons: An Outbreak in a Nursing Home*, 94 Annals Internal Med 606 (1981); A. Rudd, *Tuberculosis in a Geriatric Unit*, 33 J Am Geriatrics Soc 566 (1985); Jai P. Narain, et al, *Epidemic Tuberculosis in a Nursing Home: A Retrospective Cohort Study*, 33 J Am Geriatrics Soc 258 (1985); William W. Stead, et al, *Tuberculosis as an Endemic and Nosocomial Infection among the Elderly in Nursing Homes*, 312 New Eng J Med 1483 (1985); Centers for Disease Control and Prevention, *Prevention and Control of Tuberculosis in Facilities Providing Long-Term Care to the Elderly: Recommendations of the Advisory Committee for Elimination of Tuberculosis*, 39 Morbid & Mortal Wkly Rep 7 (1990).

105. See, for example, Centers for Disease Control and Prevention, *Tuberculosis Outbreak among Persons in a Residential Facility for HIV-Infected Persons—San Francisco*, 40 Morbid & Mortal Wkly Rep 649 (1991); Centers for Disease Control and Prevention, *Transmission of Multidrug-Resistant Tuberculosis from an HIV-Positive Client in a Residential Substance-Abuse Treatment Facility—Michigan*, 40 Morbid & Mortal Wkly Rep 129 (1991).

106. See, for example, Centers for Disease Control and Prevention, *Probable Transmission of Multidrug-Resistant Tuberculosis in Correctional Facility—California*, 269 JAMA 978 (1993); M. Miles Braun, et al, *Increasing Incidence of Tuberculosis in a Prison Inmate Population: Association with HIV Infection*, 261 JAMA 393 (1989); Dixie E. Snider and Mary D. Hutton, *Tuberculosis in Correctional Institutions*, 261 JAMA 436 (1989).

107. See, for example, Centers for Disease Control and Prevention, *Tuberculosis among Residents of Shelters for the Homeless—Ohio, 1990*, 40 Morbid & Mortal Wkly Rep 869 (1991).

108. See, for example, Centers for Disease Control and Prevention, *Tuberculosis Outbreak on Standing Rock Sioux Reservation—North Dakota and South Dakota, 1987-1990*, 40 Morbid & Mortal Wkly Rep 204 (1991).

109. See, for example, Centers for Disease Control and Prevention, *Tuberculosis among Foreign-Born Persons Entering the United States: Recommendations of the Advisory Council for the Elimination of Tuberculosis*, 39 Morbid & Mortal Wkly Rep 1 (1990).

110. See, for example, Centers for Disease Control and Prevention, *Prevention and Control of Tuberculosis in Migrant Farm Workers: Recommendations of the Advisory Council for the Elimination of Tuberculosis*, 41 Morbid & Mortal Wkly Rep 1 (1992).

beds are inches or feet apart; residents live, eat, and sleep in small enclosed spaces; buildings are dark and badly ventilated; and residents are malnourished, in poor health, overrepresentative of populations with communicable disease, and significantly impeded in their access to health services.[111]

A. Tuberculosis in Correctional Facilities

Given the disproportionate prevalence of drug dependency, HIV infection, and low socioeconomic status in the prison population, together with the overcrowded and badly ventilated conditions, high rates of tuberculosis would be expected. As one public health expert warned, spending time in correctional facilities is an independent risk factor for tuberculosis.[112] The rate of tuberculosis in correctional facilities is more than three times higher than in the general population.[113] Between ten and twenty-five percent of the population in correctional facilities are infected with M. TB.[114] In 1993, 1,177 inmates were under treatment for active disease, a 154 percent increase from 1990. Corrections systems reported forty-five current and 140 cumulative cases of drug-resistant tuberculosis.[115] The growth of tuberculosis in large prison systems with high numbers of HIV-infected inmates has been formidable. From 1977 to 1992, the annual incidence of active tuberculosis among New York State inmates increased by more than 1,300 percent; in 1991, ninety-five percent of inmates with tuberculosis were also infected with HIV.[116] Similarly dramatic increases in tuberculosis have been reported in other major correctional systems such as in New Jersey and California.[117]

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111. See Edward A. Nardell, *Tuberculosis in Homeless, Residential Care Facilities, Prisons, Nursing Homes, and Other Close Communities*, 4 Semin Respir Infect 206 (1989).

112. William W. Stead, *Undetected Tuberculosis in Prison: Source of Infection for Community at Large*, 240 JAMA 2544 (1978). See also Eran Y. Bellin, David D. Fletcher, and Steven M. Safyer, *Association of Tuberculosis Infection with Increased Time in or Admission to the New York City Jail System*, 269 JAMA 2228 (1993) (arguing that the demonstrated association between jail time and development of TB suggests that the New York City jail system may be an important amplification point in the ongoing TB epidemic).

113. See Centers for Disease Control and Prevention, *Control of Tuberculosis in Correctional Facilities: A Guide for Health Care Workers* 3 (1992); Centers for Disease Control and Prevention, *Control and Prevention of Tuberculosis in Correctional Institutions: Recommendations of the Advisory Committee for the Elimination of Tuberculosis*, 38 Morbid & Mortal Wkly Rep 313 (1989); Andrew A. Skolnich, *Correction Facility TB Rates Soar; Some Jails Bring Back Chest Roentgenograms*, 268 JAMA 3175 (1992).

114. See Theodore M. Hammett and Lynne Harrold, *Tuberculosis in Correctional Facilities* 7-8 (US Dept of Justice, 1994).

115. Id at 9-12.

116. See Jordan B. Glaser and Robért B. Greifinger, *Correctional Health Care: A Public Health Opportunity*, 118 Annals Internal Med 139, 141 (1993); Braun, et al, 261 JAMA at 393 (cited in note 106); Perry F. Smith, et al, *HIV Infection among Women Entering the New York State Correction System*, 81 Am J Pub Health 35 (1991).

117. See Hammett and Harrold, *Tuberculosis in Correctional Facilities* at 3-4; Centers for Disease Control and Prevention, *Control of Tuberculosis in Correctional Facilities* at

Tuberculosis is a health hazard not only for inmates and corrections officers, but also for the general public. Short stays in jails and the overall large population of prisons mean that more than eight million inmates are released each year.[118] Since the median age of released inmates is relatively young, the total lifetime risk for tuberculosis in persons infected during incarceration is considerable.

Despite the well documented risks to inmates, corrections workers, and the public, the health services programs in many correctional systems fall short of recommended standards set by professional medical organizations.[119] Few corrections facilities meet the rigorous tuberculosis control standards set by the Centers for Disease Control and Prevention (CDC), which include requirements for screening, contact investigations, directly observed therapy, and respiratory isolation.[120]

1. Constitutional duty to protect.

The CDC guidelines present a powerful legal dilemma for corrections authorities. While the guidelines do not explicitly recommend the use of compulsion, failure to implement a comprehensive program of mandatory public health interventions could violate the Eighth Amendment's proscription of cruel and unusual punishment. On the other hand, compelling an inmate to be tested,

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118. See Centers for Disease Control and Prevention, 38 Morbid & Mortal Wkly Rep 313 (cited in note 113); Glaser and Greifinger, 118 Annals Internal Med 139 (cited in note 116).

119. See Janet Weiner and E. Jaye Anno, *The Crisis in Correctional Health Care: The Impact of the National Drug Control Strategy on Correctional Health Services*, 117 Annals Internal Med 71 (1992) (noting that as of 1991, only eleven percent of prisons and seven percent of jails were accredited by the National Commission on Correctional Health Care).

120. The CDC recommends that each correctional institution designate a tuberculosis control official; PPD screening is carried out at entry or employment and, thereafter, annually; chest radiographs are given within seventy-two hours of a positive skin test reading or identification of symptoms; sputums submitted for smear and culture examination in cases of suspected disease; investigations of the contacts of suspected cases take place; persons with suspected or confirmed disease placed in respiratory isolation (e.g., housed in an area with separate ventilation to the outside, negative air pressure, and at least four to six air exchanges per hour); prompt treatment and directly observed therapy for all persons in need of IPT or curative treatment; capacity for drug-susceptibility testing; and general improvement in the overall environment of the institution, with possible use of ultra-violet lighting. See Centers for Disease Control and Prevention, 38 Morbid & Mortal Wkly Rep 313. See also Hammett and Harrold, *Tuberculosis in Correctional Facilities* at 16-17 (cited in note 114) (Approximately forty percent of prison and jail systems did not even have a designated TB control person.).

Tuberculosis strategies in jails may be quite different from those in prisons. Inmates in prisons are usually confined for extended periods of time, enabling longer-term treatment, follow-up, and contact investigations. By contrast, some jail inmates stay only a few hours, and most are released within days or weeks. The short length of stay and high turnover present different public health problems in the jail system. Accordingly, the CDC is considering revised guidelines to apply to the jail system. See id at 16.

treated, or segregated may violate his civil rights.[121] Accordingly, corrections authorities have had to reconcile the individual rights of inmates against the health needs of the correctional population, never fully knowing which of these two approaches the law requires.[122]

Courts have been highly deferential in resolving this dilemma,[123] often upholding the decisions of corrections officials even when they appeared contradictory.[124] This "hands-off" policy is ostensibly based upon the courts' lack of expertise needed to examine detailed decisions in prison administration.[125] Judicial deference to decisions regarding prison administration is certainly appropriate when corrections authorities are making reasonable determinations within the scope of their expertise. Accordingly, courts properly are skeptical of interfering with decisions involving such matters as prison security, management, or inmate behavior.[126] The justification for deference to the health decisions of corrections authorities is far less convincing. Most of the important standards for the protection of prisoner health are established by public health and medical authorities, not corrections officials. While protection of health is legitimately a penological interest, it is more appropriately conceived of as a wider societal interest. When an individual is confined, the state a responsibility to assure that that individual does not suffer significant and irreversible harm. Judicial deference might still be appropriate where public health guidelines are unavailable, ambiguous, or contradictory. However, where guidelines are clear and convincing, the case for upholding decisions not to comply loses credibility.[127]

The potential for the spread of tuberculosis through airborne transmission in

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121. For a general discussion of this point, see the excellent article by Scott Burris, *Prisons, Law, and Public Health: The Case for a Coordinated Response to Epidemic Disease Behind Bars*, 47 U Miami L Rev 291 (1992).

122. In the context of tuberculosis, see the excellent reviews of case law in Hammett and Harrold, *Tuberculosis in Correctional Facilities* at 45-51 (cited in note 114); John Boston, *Highlights of Most Important Cases: Tuberculosis Case a Wake-up Call*, 7 Natl Prison Proj J 6 (Fall 1992); Jan Elvin, *TB Comes Back, Poses Special Threat to Jails, Prisons*, 7 Natl Prison Proj J 1 (Winter 1992).

123. See *Monmouth County Correctional Inst Inmates v Lanzaro*, 834 F2d 326, 343 (3d Cir 1987); Burris, 47 U Miami L Rev at 322-24; Shawn Marie Boyne, *Women in Prison with AIDS: An Assault on the Constitution?*, 64 S Cal L Rev 741, 760 (1991).

124. In the prison HIV epidemic, for example, the courts have upheld decisions to segregate, decisions not to segregate, decisions to screen, and decisions not to screen. See text accompanying notes 162-65.

125. See *Bell v Wolfish*, 441 US 520, 544 (1979). In *Turner v Safley*, 482 US 78 (1987), the Supreme Court held that prison regulations would generally be upheld if they were reasonably related to legitimate penological interests. Id at 89.

126. See *Rhodes v Chapman*, 452 US 337, 351 n 16 (1981); *Washington v Harper*, 494 US 210, 223 (1990).

127. For example, in the HIV prison epidemic, the courts have frequently upheld the use of compulsory screening and segregation despite the substantial consensus of public health opinion opposing compulsory interventions. See, for example, National Commission on Acquired Immune Deficiency Syndrome, *HIV Disease in Correctional Facilities* (1991); Centers for Disease Control and Prevention, *HIV Prevention in the U.S. Correctional System, 1991*, 41 Morbid & Mortal Wkly Rep 389 (1992).

congregate settings and the capacity of treatment to cure and render the person non-infectious have led public health officials to uniformly favor comprehensive tuberculosis control measures in corrections facilities.[128] Given CDC and other medical guidelines, screening, prevention, treatment, and control of tuberculosis in corrections facilities can be properly considered accepted medical practice. Yet, many correctional systems have failed to follow the guidelines. As a result, much of the tuberculosis litigation has rested on the claim that prison officials have unconstitutionally failed to protect the health of inmates and workers.[129] Thus, compliance with CDC guidelines or some other reasonable health standards may in fact be constitutionally required.[130]

The Eighth Amendment does not permit states to disregard the health needs of inmates.[131] The standard for determining if there has been an Eighth Amendment violation is whether there has been "deliberate indifference to the serious medical needs of prisoners."[132] "Such indifference may be shown by 'repeated examples of negligent acts which disclose a pattern of conduct by the prison medical staff' or by demonstrating 'systemic or gross deficiencies in staffing, facilities, equipment or procedures.'"[133] The "deliberate indifference" standard requires an examination of the subjective intent of corrections officials. The benign intentions of officials may preclude the finding of a constitutional violation even if they inadvertently fail to take action necessary for the protection

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128. In addition to the CDC guidelines described in note 120, see Centers for Disease Control and Prevention, *Control of Tuberculosis in Correctional Facilities* (cited in note 113).

129. See *Brown v Briscoe*, 998 F2d 201, 204 (4th Cir 1993) (holding that requiring inmate to take tuberculosis vaccination does not violate the Eighth Amendment); *Haavisto v Perpich*, 498 NW2d 746 (Minn App Ct 1993) (holding that commissioner and warden are entitled to rely on medical personnel for clinical determinations and have qualified immunity, but that material issue of fact as to whether reasonably competent physician would have diagnosed inmate's active TB precluded summary judgment for physician); *Byrd v Reynolds*, 989 F2d 498 (6th Cir 1993); *Ogle v New York*, 191 AD2d 878, 881, 594 NYS2d 824, 826 (NY App Div 1993) (concluding that the DOC violated its own guidelines in connection with treatment of patient who tested positive for M. TB).

130. See *DeGidio v Pung*, 704 F Supp 922 (D Minn 1989). In *DeGidio*, the court held that although published guidelines of medical care do not establish absolute standards for measuring the constitutionality of official action, they are "useful measures for determining whether contemporary standards of decency have been met." Id at 956 (quoting *Ramos v Lamm*, 639 F2d 559, 567 n 10 (10th Cir 1980), cert denied, 450 US 1041 (1981)).

131. See *Harris v Thigpen*, 941 F2d 1495, 1504-05 (11th Cir 1991); Note, *In Prison with AIDS: The Constitutionality of Mass Screening and Segregation Policies*, 1988 U Ill L Rev 151, 160-61.

132. *Harris*, 941 F2d at 1504. See also *City of Canton v Harris*, 489 US 378 (1989) (holding that failure to train police officers to deal with medical needs of inmates can bring municipal liability under § 1983); *Berry v City of Muskogee*, 900 F2d 1489 (10th Cir 1990) (holding that the Eighth Amendment applies to an inmate awaiting sentencing); *Hill v Marshall*, 962 F2d 1209, 1214 (6th Cir 1992) (holding that an official acts with deliberate indifference to medical needs if he disregards a known or obvious risk).

133. *Inmates of Occoquan v Barry*, 717 F Supp 854, 867 (D DC 1989) (quoting *Ramos v Lamm*, 639 F2d at 575).

of the health of inmates.[134]

Correctional officials appear to have some constitutional duty, based on the Eighth Amendment, to screen the inmate population for M. TB or, at least, to make some clinical determination concerning the risk of tuberculosis.[135] In *DeGidio v Pung*,[136] the court observed that prisons were high risk environments for tuberculosis and, as a result, screening and control measures were necessary to prevent outbreaks.[137] The district court found that the failure to diagnose and treat the initial cases promptly, to advise inmates of their exposure, to test all inmates even after all staff had been tested, to develop a policy, and to designate a person with the ultimate responsibility for controlling tuberculosis, constituted a deliberate indifference to the medical needs of inmates.[138]

Other courts, while not requiring PPD screening, have insisted that all inmates receive an initial medical examination including "such tests as are necessary in the opinion of the physician to identify and isolate those who have communicable diseases."[139] Future judicial determinations about tuberculosis screening will likely depend on the expected prevalence of tuberculosis in the prison population and the adequacy of the entire tuberculosis control program in the prison, including the prison environment and overcrowding. The greater the likelihood of tuberculosis outbreaks, the more courts can be expected to require tuberculin skin testing for the entire population.

Some courts have held that the knowing or systematic failure to segregate prisoners with communicable disease violates the Constitution.[140] Certainly, corrections authorities have the duty to segregate any individual with active tuberculosis to protect the inmate population.[141] However, it would not be necessary to segregate individuals with M. TB infection who showed no signs of clinically active disease or probability of reactivation since the risk of contagion approaches zero.[142]

Correctional authorities also have a duty arising under the Eighth Amendment, and under tort law, not to ignore the apparent needs of persons with M.

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134. See *Wilson v Seiter*, 501 US 294, 305-06 (1991).

135. See, for example, *Holt v Hutto*, 363 F Supp 194, 200 (E D Ark 1973) (It "goes without saying that [tubercular inmates] must be segregated.").

136. 920 F2d 525 (8th Cir 1990).

137. *DeGidio*, 920 F2d at 527.

138. See *DeGidio v Pung*, 125 FRD 503 (D Minn 1989); *DeGidio v Pung*, 723 F Supp 135 (D Minn 1989).

139. *Lareau v Manson*, 651 F2d 96, 111 (2d Cir 1981).

140. *Smith v Sullivan*, 553 F2d 373, 380 (5th Cir 1977).

141. See *McFadden v State*, 542 S2d 871, 881 (Miss 1989) (holding that an inmate who contracted TB from fellow prisoner is entitled to proceed over Rule 12(b)(6) motion [for failure to state a claim] in litigation alleging intentionally tortious or grossly negligent conduct); *Wilder v Leak*, 1992 WL 97678 (N D Ill) (refusing to dismiss civil rights complaint based on failure of Cook County Department of Corrections to separate persons with TB from prison population).

142. See *Triggs v Marshall*, 1994 WL 109748, *4 (N D Cal). But see *Wilder*, 1992 WL 97678 (refusing to dismiss civil rights complaint based on failure to separate TB positive from TB negative inmates).

TB infection or clinical disease for preventive or curative treatment. Deliberate indifference to the treatment needs of prisoners may result in damages for violation of constitutional rights. In *Hill v Marshall*,[143] the Sixth Circuit overturned the trial court's rejection of a jury award of ninety-five thousand dollars in compensatory damages and $990,000 in punitive damages against a prison official who failed to provide prescribed IPT, despite repeated complaints by the inmate.[144] The court found that the official's actions amounted to a pervasive pattern of indifference to the prisoner's medical needs.[145]

In the face of a resurgent epidemic and the possibility of future outbreaks of MDR-TB in vulnerable populations of inmates with HIV infection, courts have become proactive. In *Austin v Pennsylvania Department of Corrections*,[146] the court granted a preliminary injunction requiring the Pennsylvania Department of Corrections (DOC) to implement guidelines for the prevention and management of tuberculosis.[147] The court saw a probability of irreparable injury to the plaintiff class at fourteen DOC facilities because "[i]nmates confined at correctional institutions face a higher risk of being infected with TB than the general public due to the close proximity of inmates, the high level of dust particles on which droplet nuclei can become attached and mechanically recirculated air which has not been exposed to sunlight or ultraviolet light."[148]

In some cases, courts have required corrections authorities to spend considerable resources to impede the spread of tuberculosis. One court, for example, required the New York City Department of Corrections to construct forty-two negative-pressure isolation rooms at Rikers Island.[149] The court held that all inmates with tuberculosis "must be housed in CDUs [contagious disease isolation units] which must be promptly erected and equipped by the City."[150] Construction of the units cost more than twelve million dollars.[151]

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143. 962 F2d 1209 (6th Cir 1992).

144. Id at 1217.

145. Id at 1214. Simple failure to diagnose or treat tuberculosis may not rise to the level of indifference to medical needs required to show a violation of the Constitution. Constitutional violations require some willful act or pervasive neglect of health needs, such as when correctional officials fail to follow up on their own recommendation, refuse to allow an inmate to see a doctor, interfere with prescribed treatment, or systematically do not comply with CDC guidelines.

146. 1992 WL 277511 (E D Pa).

147. Id at *1.

148. Id at *4.

149. *Vega v Sielaff*, 1991 WL 258806 (S D NY).

150. Id. See also Mitch Gelman, *A Prison Breeding Ground: Jails Incubators for Tuberculosis*, Newsday 23 (Mar 11, 1992).

151. James Barron, *Panel to Recommend Ways to Fight TB in New York Jails*, NY Times B5 (June 25, 1992). See also Steven M. Safyer, et al, *Tuberculosis in Correctional Facilities: The Tuberculosis Control Program of the Montefiore Medical Center Rikers Island Health Services*, 21 J L Med & Ethics 342, 347-48 (1993) (The initial units cost nearly five hundred thousand dollars per cell.).

2. Constitutional power to screen and segregate.

Even though the CDC guidelines are silent on whether the interventions should be compulsory, litigation based on the theory that tuberculosis control violates the individual rights of prisoners has begun to emerge. In *Jolley v Keane*,[152] a New York court upheld mandatory requirements for tuberculin skin testing. A prisoner who refused testing on religious grounds was put on "medical keeplock," which involved twenty-four hour confinement to his cell.[153] The court found "a rational connection between mandatory testing and the governmental interest of identifying and controlling the spread of TB. There is also a valid, rational connection between mandatory medical keeplock and the need for an effective medical program that identifies the spread of the disease."[154] Other courts have concurred that inmates do not have a right to refuse BCG vaccination,[155] testing,[156] IPT, or treatment[157] that is well within existing standards of medical care.

The approach of the courts in reviewing challenges to mandatory health interventions resembles the reasoning of the Supreme Court in *Washington v Harper*.[158] Emphasizing the leeway given to corrections officials in matters of safety and security, the Court permitted the state to forcibly treat a mentally ill inmate with antipsychotic drugs if the inmate was dangerous to himself or others and the treatment was in the inmate's medical interests.[159] Undoubtedly, the state could demonstrate a similarly rational connection between the administration of medically appropriate tuberculosis treatment on the one hand, and a benefit to the health of the inmate and the corrections population on the other.

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152. No 15385 (NY Sup Ct, Westchester Cnty, Dec 22, 1992).

153. Id.

154. Id.

155. See *Brown v Briscoe*, 998 F2d at 201.

156. See *Langton v Comm'r of Correction*, 34 Mass App Ct 564, 614 NE2d 1002 (Mass App Ct 1993); *Moody v McFadden*, 5 F3d 538 (9th Cir 1993); *Johnson v Keane*, 1994 WL 37790 (S D NY) (upholding confinement of prisoner to cell for refusal to submit to PPD test); *Williams v Keane*, 1994 WL 267865 (S D NY) (dismissing complaint for failure to exhaust administrative remedies in case where prisoner was kept in medical keeplock for refusal to submit to PPD); *Ballard v Woodard*, 641 F Supp 432 (W D NC 1986); *Escoe v Wankum*, 1994 US App LEXIS 7158 (8th Cir 1994) (holding that prisoner forced to take PPD and IPT was not deprived of his Eighth Amendment rights); *Harris v Lopez*, 1992 US Dist LEXIS 12603 (N D Cal); *Holmes v Fell*, 856 F Supp 181 (S D NY 1994) (allowing administration of PPD test despite previous positive test); *Byrd v Reynolds*, 1993 US App LEXIS 6646 (6th Cir); *Mack v Campbell*, 1991 US App LEXIS 28162 (6th Cir).

157. *Escoe v Wankum*, 1994 US App LEXIS 7158 (compelling a prisoner to take PPD and IPT); *Britton v Armontrout*, 1993 US App LEXIS 3097 (8th Cir) (forcing a prisoner either to take medicine or to be segregated).

158. 494 US 210 (1990).

159. Id at 227. Accord *Riggins v Nevada*, 112 S Ct 1810, 1814-15 (1992) (holding that forcing an antipsychotic drug on a convicted prisoner is impermissible absent a finding of overriding justification and a determination of medical appropriateness).

Future litigation asserting individual rights to be free from mandatory tuberculosis control measures are unlikely to be successful where corrections authorities comply with public health advice. The doctrine of judicial deference would find a rational nexus between the interventions and the valid penological goal of protection of the health of inmates and workers. Further, alternative voluntary approaches that permit inmates to refuse to comply with tuberculosis measures would place the correctional population at risk.

Litigation to protect individual rights would have the best chance of succeeding where the intervention was outside of CDC or other public health guidelines. For example, litigation to invalidate segregation of all prisoners with M. TB infection or isolation of prisoners who are not currently infectious ought to succeed. Interference with constitutionally protected liberty interests of infected inmates would not be justified by a significant risk to the health of the corrections population.[160] Even if the intervention were within public health guidelines, individual rights litigation could conceivably be successful where corrections authorities singled out prisoners for punitive treatment while failing to provide an overall safe environment for inmates. For example, a decision to compulsorily screen, segregate, and require directly observed therapy only for a small subset of similarly situated inmates, while failing to provide adequate ventilation and treatment, might violate both individual and collective rights. The individuals affected might claim an infringement of their protected liberty interests, and the wider corrections population might claim an infringement of their right to be protected against contracting a potentially lethal disease while in confinement.

3. Enhanced use of compulsory powers against inmates with HIV.

The dilemma between the individual rights of inmates and the health needs of the entire correctional population has played out dramatically in HIV prison litigation. Courts have vacillated between demanding mandatory HIV screening, disclosure of results, and segregation of infected inmates to protect the public health and holding that compulsory powers violate the individual rights of inmates.[161] Since HIV is not transmitted through the air, most public health authorities have not recommended mandatory interventions in corrections facilities.[162] Some courts have focused on the absence of public health support to uphold the decisions of corrections authorities not to screen or segregate inmates.[163] Other courts, however, have refused to invalidate mandatory inter-

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160. See *DeGidio*, 704 F Supp at 924.

161. See generally Theodore M. Hammett, et al, *1992 Update: HIV/AIDS in Correctional Facilities—Issues and Options* 79-91 (Natl Inst Justice, 1994); Burris, 47 U Miami L Rev at 307-21 (cited in note 121).

162. See National Commission on AIDS, *Report: HIV Disease in Correctional Facilities* (1991); World Health Organization, *WHO Guidelines on HIV Infection and AIDS in Prisons* (1993); Hammett, et al, *1992 Update*; Centers for Disease Control and Prevention, 41 Morbid & Mortal Wkly Rep 389 (cited in note 127).

163. See, for example, *Walker v Sumner*, 917 F2d 382 (9th Cir 1990) (The State had

ventions by corrections authorities, even in the absence of a scientific foundation for their actions.[164] The net result is that courts have upheld decisions to segregate, decisions not to segregate, decisions to screen, and decisions not to screen.

An issue looming in prison litigation is how the coincidence of tuberculosis and HIV disease may shift the balance of interests even further in the direction of deference to prison authorities and away from the protection of individual rights. The emergence of MDR-TB may even propel the courts into considering whether compulsory measures against inmates with HIV infection may be constitutionally required to impede the correctional tuberculosis epidemic—protecting HIV-infected inmates themselves from tuberculosis and protecting other inmates and staff.

Consider the hypothetical claim of corrections authorities that it is necessary to screen and segregate inmates for HIV infection in order to impede the spread of tuberculosis. Persons who are found positive for HIV can be given anergy tests and other diagnostics for tuberculosis, considered for IPT, and perhaps segregated in case they develop active clinical tuberculosis before it is detected by corrections officials. It is conceivable that, although this course of action has never been recommended by the U.S. Public Health Service, courts may find this argument plausible and rationally related to legitimate penological interests.

There are strong reasons for courts to reject claims for compulsion directed at persons with HIV infection based upon possible coinfection with M.TB. Decisions to compulsorily screen and segregate inmates are not justified based on HIV infection alone. Since the status of being infected with HIV poses no risk to the corrections population in itself, arguments for screening and segregation are rational only if corrections authorities can show some additional risk factor, such as a demonstrated propensity of sexual (either consensual or coercive) or needle-sharing behavior. Absent such a showing, the compulsory intervention is considerably overbroad, catching in its coercive web many inmates who pose no health hazard to themselves or others. Additionally, the compulsory interventions themselves violate individual liberty and privacy interests of inmates because their serological status is disclosed to others, and they lose many of their privileges of being in the mainstream prison population. Accordingly, the possibility that HIV infected individuals would transmit M. TB would have to be palpably real in order to justify the mandatory intervention. Given the presence of a thoughtful and well resourced tuberculosis program, the chances of transmission of M. TB infection would be remote. Comprehensive tuberculosis identification programs would detect most individuals with HIV infection through routine screening and

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offered only conclusory allegations that its mandatory HIV-testing policy furthered a legitimate penological interest.); *Nolley v County of Erie*, 776 F Supp 715 (W D NY 1991) (holding that the segregation of HIV positive inmate violated her constitutional right to privacy and lacked a legitimate penological purpose because segregation is so remotely connected to the goal of protecting health of corrections population as to render the policy irrational and arbitrary).

164. See, for example, *Harris*, 941 F2d at 1495; *Dunn v White*, 880 F2d 1188, 1195 (10th Cir 1989).

follow-up. Further, since it would be in their clinical interests to know and to disclose their HIV status to medical personnel, inmates would routinely be offered HIV testing. In the relatively rare event when conscientious prison surveillance would fail to detect cases of M. TB infection, it would still be likely that contagious disease would be identified rapidly after the development of coughing or other characteristic symptoms. To be sure, this would not eliminate the risk of tuberculosis in prisons and jails. However, it is apparent that the systemic approaches to tuberculosis control emphasizing coordination of a broad range of surveillance, prevention, and treatment services are far more likely to impede the prison tuberculosis epidemic than the introduction of compulsory screening and segregation of HIV infected inmates.

Properly conceived, corrections facilities need not remain a potent health hazard but rather a public health opportunity. Before their incarceration many inmates had poor health, including high rates of communicable disease, which is difficult to identify and treat in poorer, homeless, and underground populations. Society is ill-served by policies that fail to deal with, and that even exacerbate, disease during confinement which is then spread to the wider population. It is more cost effective and beneficial to inmates, their families, and communities to use the period of confinement to reach an otherwise elusive group. Public health-oriented health education and promotion, counseling, prevention, and treatment serves both humanitarian as well as substantial public health interests.[165]

B. Occupational Safety in Health Care Facilities

Health care facilities, like prisons and other closed settings, at once present a significant health hazard to residents and workers as well as an opportunity for impeding the tuberculosis epidemic. Unfortunately, America's health care settings have often elevated the risk of transmission of tuberculosis and have failed to intervene systematically in the epidemic.

The association between working or residing in a health care facility and increased risk of tuberculosis is well recognized.[166] Physicians, nurses, and other health care personnel have disproportionately high rates of tuberculosis compared with the general population.[167] Tuberculosis in some acute[168] and

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165. See Glaser and Greifinger, 118 Annals Internal Med 139 (cited in note 116); Robert B. Greifinger, Nancy J. Heywood, and Jordan B. Glaser, *Tuberculosis in Prison: Balancing Justice and Public Health*, 21 J L Med & Ethics 332 (1993). See also Lawrence O. Gostin, *The Interconnected Epidemics of Drug Dependency and AIDS*, 26 Harv CR-CL L Rev 113 (1991).

166. Centers for Disease Control and Prevention, *Guidelines for Preventing the Transmission of Tuberculosis in Health-Care Settings, with Special Focus on HIV-Related Issues*, 39 Morbid & Mortal Wkly Rep 1 (1990).

167. See Elizabeth Barrett-Connor, *The Epidemiology of Tuberculosis in Physicians*, 241 JAMA 33 (1979); K. P. Goldman, *Tuberculosis in Hospital Doctors*, 69 Tubercle 237 (1988); Charles E. Haley, et al, *Tuberculosis Epidemic among Hospital Personnel*, 10 Infect Control & Hosp Epidemiol 204 (1989).

168. See N. Joel Ehrenkranz and J. Leilani Kicklighter, *Tuberculosis Outbreak in a*

chronic[169] health care facilities has been endemic.[170] Nosocomial[171] outbreaks of MDR-TB have resulted in high levels of morbidity and mortality among patients[172] and workers[173] in health care facilities.

1. Risk assessment and public health regulation: The fallacy of the zero risk assumption.

The Congressional mandate of the National Institute for Occupational Safety and Health (NIOSH) is to develop standards so that "no employee will suffer impaired health or functional capacities or diminished life expectancy as a result of his [or her] work experience."[174] From this legislative mandate, NIOSH has arrived at an operational philosophy of "public health prudence," which holds that "when faced with uncertainty, it is better to err in favor of human life and health than in favor of any competing value."[175]

General Hospital: Evidence for Airborne Spread of Infection, 77 Annals Internal Med 377 (1972); David L. Horn, et al, 327 New Eng J Med 1816 (cited in note 103); Centers for Disease Control and Prevention, 40 Morbid & Mortal Wkly Rep 585 (cited in note 52).

169. See Carole Brennen, Robert R. Muder, and Paul W. Muraca, *Occult Endemic Tuberculosis in a Chronic Care Facility*, 9 Infect Control Hosp Epidemiol 548 (1988).

170. See Mary Devereaux Hutton, et al, *Nosocomial Transmission of Tuberculosis Associated with a Draining Abscess*, 161 J Infect Dis 286 (1990); Antonio Catanzaro, *Nosocomial Tuberculosis*, 125 Am Rev Respir Dis 559 (1982).

171. Nosocomial transmission denotes a new disorder (unrelated to the patient's primary condition) associated with being treated in a hospital. *Steadman's Medical Dictionary* 958 (W. H. Anderson, 4th Unabr Lawyers ed 1976).

172. See Brian R. Edlin, et al, *An Outbreak of Multidrug-Resistant Tuberculosis among Hospitalized Patients with the Acquired Immunodeficiency Syndrome*, 326 New Eng J Med 1514 (1992); Centers for Disease Control and Prevention, 40 Morbid & Mortal Wkly Rep 585; Samuel W. Dooley, et al, *Nosocomial Transmission of Tuberculosis in a Hospital Unit for HIV-Infected Patients*, 267 JAMA 2632 (1992); Margaret A. Fischl, et al, *An Outbreak of Tuberculosis Caused by Multiple-Drug-Resistant Tubercle Bacilli among Patients with HIV Infection*, 117 Ann Intern Med 177 (1992); Consuelo Beck-Sagué, et al, *Hospital Outbreak of Multidrug-Resistant* Mycobacterium Tuberculosis *Infections: Factors in Transmission to Staff and HIV-Infected Patients*, 268 JAMA 1280 (1992); Michele L. Pearson, et al, *Nosocomial Transmission of Multidrug-Resistant* Mycobacterium Tuberculosis*: A Risk to Patients and Health Care Workers*, 117 Annals Internal Med 191 (1992); David L. Horn, et al, 327 New Eng J Med 1816 (cited in note 103).

173. Samuel W. Dooley, *Multidrug-Resistant Tuberculosis*, 117 Annals Internal Med 257 (1992); Centers for Disease Control and Prevention, *Nosocomial Transmission of Multidrug-Resistant Tuberculosis to Health-Care Workers and HIV-Infected Patients in an Urban Hospital—Florida*, 39 Morbid & Mortal Wkly Rep 718 (1990); Pearson, et al, 117 Annals Internal Med at 191; Charlotte Malasky, et al, *Occupational Tuberculosis Infections among Pulmonary Physicians in Training*, 142 Am Rev Respir Dis 505 (1990). See also *The New White Plague: Some Doctors Are Beginning to Fear the "Bulletproof Tubercle" Even More Than HIV*, Physicians Wkly 92 (Mar 30, 1992).

174. Occupational Safety and Health Act of 1970, Pub L No 91-596, 84 Stat 1590, 1610 (1970), codified at 29 USC § 669 (1988).

175. Centers for Disease Control and Prevention, *NIOSH Recommended Guidelines for Personal Respiratory Protection of Workers in Health Care Facilities Exposed to Tuberculosis* 5 (US Dept of Health and Human Serv, 1992). In support of its position, NIOSH cites *United Steelworkers v Marshall*, 647 F2d 1189 (DC Cir 1980).

Based upon this operational philosophy, CDC has issued a highly comprehensive set of draft guidelines for preventing the transmission of tuberculosis in health care facilities.[176] In addition to standard recommendations for detection, prevention, and management of tuberculosis,[177] the guidelines offer detailed instructions for engineering controls in health care settings that have become highly charged. Health care workers are advised to use respirators with high-efficiency particulate air filters (HEPA respirators) in isolation rooms for patients with possible active disease.[178] It has been estimated that preventing a single case of occupational tuberculosis during the next forty-one years by implementing the proposed requirements for HEPA respirators and a respiratory-protection program would cost between $1.3 to $18.5 million in one hospital alone.[179] HEPA respirators have also been criticized for clinical reasons: the hooded, gas-mask type structure is frightening to patients, stigmatizes patients with tuberculosis, and muffles the voice, interfering with patient communication.[180]

Tuberculosis control in health care settings epitomizes the two opposite ends of health regulation, with each extreme representing an error in judgment. At one end are the 1990 CDC guidelines for prevention of transmission of tuberculosis in health care settings. These guidelines are not regulatory in nature and have been widely ignored. The result of noncompliance has been tragic outbreaks of disease among patients and staff. In every disease outbreak, once these guidelines were followed the health hazard was rapidly brought under control.[181] At the other extreme is the attempt by regulatory agencies such as the Environmental Protection Agency and OSHA to compel expensive engineering controls and special respiratory masks in the absence of empirical data suggesting

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176. Centers for Disease Control and Prevention, *Draft Guidelines for Preventing the Transmission of Tuberculosis in Health-Care Facilities*, 58 Fed Reg 52810 (1993).

177. The guidelines recommend assignment of responsibility for TB control to specific hospital authorities; a careful risk assessment, development of a TB control plan, and periodic reassessment; detection of patients who may have active TB; management of patients in ambulatory care settings and emergency rooms; management of hospitalized patients with TB; reduction in the risk of cough-inducing clinical procedures; education and training of workers; counseling, screening and evaluation of workers; and coordination with the Public Health Department. Id.

178. Id at 52821. The Occupational Safety and Health Administration announced in October 1993 that it would require use of HEPA respirators and a respiratory-protection program. See Michael D. Decker, *OSHA Enforcement Policy for Occupational Exposure to Tuberculosis*, 14 Infect Control & Hosp Epidemiol 689 (1993).

179. K. A. Adal, et al, *The Use of High-Efficiency Particulate Air Filter Respirators to Protect Hospital Workers from Tuberculosis: A Cost-Effectiveness Analysis*, 331 New Eng J Med 169 (1994).

180. Id at 172; Rebecca Voelker, *New Guidelines Prompt Debate over TB Control*, Am Med Assoc News 1 (Oct 19, 1992) (quoting Michael Iseman as saying "I do not think, as a clinician, I could ever see myself going to a patient's bedside in a Darth Vader mask. It would create such a surreal, dehumanizing, stigmatizing image that I couldn't live with it.").

181. Adal, et al, 331 New Eng J Med at 171; US Congress, Office of Technology Assessment, *Continuing Challenge* at 51 (cited in note 35).

their cost effectiveness.[182] In seeking to ensure the safety of health care workers and patients, it is important to measure the health hazard against common risks incurred in daily life. Some of the regulatory standards, such as the HEPA filter mask, are aimed at reduction of risks to such a minute level that they are probably below risks entailed in everyday activities such as riding public transportation. Seeking to meet a standard of near zero risk is not only inconceivable,[183] but counterproductive. Spending scarce resources on highly expensive, unproven technologies incurs a significant opportunity cost in the form of reduced spending on more cost effective policies.

2. Compulsory screening and exclusion of health care professionals infected with M. TB.

Screening for M. TB is required for certain populations in forty-four states, including eleven states that require PPD tests for employees of medical facilities.[184] Moreover, the CDC recommends that all health care workers should be screened for M. TB.[185] Screening persons for M. TB has long been justified on the grounds that the test itself is non-intrusive and non-stigmatic. However, the assertion that M. TB testing is less invasive and stigmatic than other medical testing is difficult to defend. Tuberculosis continues to be a highly stigmatized medical condition.[186] The fact that, like HIV and other screening, the PPD test itself is non-invasive is not the point. It is what the test reveals to the patient and to others that forms the justification for requiring informed consent.

Despite the worker's legitimate claim that compelled PPD testing infringes on important personal interests, it is likely the courts would uphold M. TB screening programs. Decisions by health care facilities to compulsorily screen and exclude workers are governed by disability law. The Americans with Disabilities Act's (ADA) prohibition against discrimination[187] includes medical examinations,

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182. NIOSH candidly admits that "the evidence is not adequate to confidently assess both the efficacy and reliability of various currently recommended procedures for preventing the transmission of tuberculosis in health-care facilities." Centers for Disease Control and Prevention, *NIOSH Recommended Guidelines* at 5 (cited in note 166). See also *Steelworkers*, 647 F2d at 1266 (OSHA "cannot let workers suffer while it awaits the Godot of scientific certainty.").

183. See Edward A. Nardell, et al, *Theoretical Limits of Protection Achievable by Building Ventilation*, 144 Am Rev Respir Dis 302 (1991).

184. Centers for Disease Control and Prevention, 42 Morbid & Mortal Wkly Rep at 10 (cited in note 49).

185. Centers for Disease Control and Prevention, *Guidelines for Preventing the Transmission of Tuberculosis in Health-Care Settings, with Special Focus on HIV-Related Issues*, 39 Morbid & Mortal Wkly Rep 1, 4, 14 (1990); Centers for Disease Control and Prevention, *Draft Guidelines*, 58 Fed Reg at 52814, 52823 (cited in note 176). See also Centers for Disease Control and Prevention, 39 Morbid & Mortal Wkly Rep 1 (cited in note 30).

186. See text accompanying notes 8-18.

187. In cases where state law requires health care facilities to engage in these policies or where the facility is operated by the government, decisions are also subject to constitutional review. See *Glover v Eastern Nebraska Community Office of Retardation*, 867 F2d

testing, and inquiries.[188] Pursuant to the ADA's explicit proscription of pre-offer employment medical examinations or inquires, it is clear that health care providers could not require applicants to submit to a PPD test or chest X-ray or ask whether the applicant is infected with M. TB.[189]

The ADA does permit an employer to require medical examinations, including M. TB screening, after an offer of employment is made, provided that all entering employees are subjected to the same examination and the medical information is kept confidential.[190] The employer cannot withdraw the job offer to a qualified person based upon a disability detected in the examination, such as a positive test PPD test result. It appears, therefore, that CDC's recommendation for PPD screening of all applicants for medical employment is lawful, provided the testing is post-offer, all entering employees are tested, the results are kept confidential, and adverse employment decisions are not based upon impermissible grounds, such as exclusion of qualified workers.

Compulsory examinations or inquiries of current employees are permitted only if they are job-related and consistent with business necessity.[191] Tuberculin skin testing is likely to be upheld as job-related and consistent with business necessity because it is part of a program recommended by federal health and regulatory authorities designed to prevent nosocomial infections of patients and workers.[192]

461, 462-63 (8th Cir 1989). Given the previously argued position that adjudication of these questions under disability law provides a more focused review than under constitutional law, this part of the Article uses the Americans with Disabilities Act as the primary lens. See Lawrence O. Gostin, *The Americans with Disabilities Act and the Corpus of Anti-Discrimination Law: A Force for Change in the Future of Public Health Regulation*, 3 Health Matrix 89 (1993).

188. Americans with Disabilities Act of 1990, 42 USC § 12112(d) (1990); 29 CFR § 1630.2 (1993). The legislative history, as well as decisions under the Rehabilitation Act and ADA show that asymptomatic infection, such as HIV infection, can be considered a current disability or regarded as a disability within the meaning of 42 USC § 12102(2). See *Doe v Centinela Hospital*, 1988 WL 81776, *11 (C D Cal); *Leckelt v Board of Comm'rs of Hosp D No 1*, 909 F2d 820, 824 (5th Cir 1990); Lawrence O. Gostin, *Impact of the ADA on the Health Care System*, in Lawrence O. Gostin and Henry A. Beyer, eds, *Implementing the Americans with Disabilities Act: Rights and Responsibilities of All Americans* ch 13 at 175 (Paul H. Brookes, 1993). See also Chai Feldblum, *Medical Examinations and Inquiries under the Americans with Disabilities Act: A View from the Inside*, 64 Temple L Rev 521, 531 (1991); Chai R. Feldblum, *Workplace Issues: HIV and Discrimination*, in Nan D. Hunter and William B. Rubenstein, eds, *AIDS Agenda: Emerging Issues in Civil Rights* 271 (New Press, 1992).

189. 42 USC § 12112(2)(A). The ADA does not proscribe inquiries as to whether the applicant can safely perform certain job-related functions such as administering aerosolized pentamidine for a physician specializing in infectious diseases. 42 USC § 12112(2)(B).

190. 42 USC § 12112(d)(3).

191. 42 USC § 12112(4). Employers may, however, conduct voluntary medical examinations which are part of an employee health program that includes tuberculosis screening.

192. Under EEOC regulations, periodic medical monitoring of current employees is permitted under the ADA if it is required by medical standards or regulation, including federal safety regulation. Equal Employment Opportunity Commission, *Annotated Regula-*

Courts are also likely to uphold M. TB screening of health care professionals under the Constitution. Constitutional claims under the Fourteenth Amendment are applicable where the state either requires private facilities to test for M. TB or where a state-operated hospital performs the test itself.[193] Screening for M. TB is unlikely to trigger more focused constitutional scrutiny since it does not threaten a fundamental right.[194] Accordingly, it will be upheld because it is reasonably designed to detect infectious conditions that pose a potential risk to patients and providers. One court upheld the constitutionality of M. TB screening in hospitals in New York because it is "not arbitrary and capricious, but [is] rational and well tailored to meet . . . health problems in different medical institutions."[195]

Tuberculin skin testing is justified because identification of M. TB infection provides substantial therapeutic benefits for the individual who can receive preventive treatment, significantly reducing the probability of progression to active disease.[196] In addition, screening protects the public health. Identification of M. TB infection renders it less likely that the person would become infectious, and it is easier to maintain surveillance to ensure that the person is rapidly isolated if he or she progresses to clinical disease.[197]

3. Compulsory screening and exclusion of health care professionals infected with HIV.

Some health care workers endure quite considerable risks of contracting M. TB or developing active clinical disease. Workers may be called upon to diagnose and treat HIV disease and tuberculosis and to engage in cough- or sputum-inducing procedures that elevate the risk of M. TB infection. If the health care professional with HIV infection contracts M. TB, particularly a drug-resistant

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tions for Title I: Regulations and Interpretive Guidance (1993).

193. Where the state takes a sample of blood or other bodily fluid to perform the test, the Fourth Amendment also may apply. See *Skinner v Railway Executives Ass'n*, 489 US 602, 613-17 (1989); *Glover*, 867 F2d at 462.

194. For example, the court in *Ritterband v Axelrod*, 562 NYS2d 605 (NY Sup Ct 1990), saw the invasion of privacy inherent in an M. TB test as de minimis because the publication of the results went only to a limited number of public officials. Id at 609.

195. *Ritterband*, 562 NYS2d at 605. Courts have also upheld the constitutionality of testing in other contexts, such as in schools. See *Conlon v Marshall*, 59 NYS2d 52 (NY Sup Ct 1945).

196. See Ronald Bayer, M. N. Dubler, and S. Landesman, *The Dual Epidemics of TB and AIDS: Ethical and Policy Issues in Screening and Treatment*, 83 Am J Pub Health 649, 650-51.

197. The purpose of M. TB screening is ostensibly to provide preventive treatment for infected persons and to increase surveillance to protect against undetected progression to active disease. In order to uphold screening programs, the health care facility would have to demonstrate that its response to a positive PPD is the provision of IPT and more active surveillance. The ADA would not permit a blanket decision to exclude a qualified M. TB-infected person with no signs of active, contagious disease because there is no significant risk to the worker or others. See *Sch Bd of Nassau County v Arline*, 480 US 273, 280-86 (1987).

strain, he or she is likely to develop difficult-to-treat clinical tuberculosis. These biological observations suggest that HIV-infected health care professionals expose themselves to considerable risks when working in high prevalence health care settings. They may also pose a risk to other professionals and patients (particularly those who are HIV-infected) if they develop active tuberculosis and spread the infection to others before being detected and isolated.

Accordingly, it is possible to argue that health authorities should be informed of the HIV status of health care workers. Tuberculosis screening programs for health care workers are recommended by the CDC and required in many states.[198] However, persons with HIV infection may be anergic and so may test falsely negative on a PPD test.[199] Consequently, even if health care facilities develop comprehensive tuberculosis identification programs, they may be unaware of precisely the workers who pose the greatest health risk—persons dually infected with HIV and M. TB. It is for this reason that health authorities, long resistant to the concept of compulsion in HIV policies, may begin to revisit the issue of mandatory HIV screening and exclusion of HIV-infected workers from health care settings.[200] Such compulsory interventions would be ostensibly justified by the significant risk to self and others.

The ADA permits adverse employment decisions against persons with disabilities if they are based on a significant risk that cannot be ameliorated through reasonable accommodations.[201] The Equal Employment Opportunity Commission (EEOC) takes the view that the direct threat standard includes a significant risk to the worker herself.[202] In an environment conducive to the spread of tuberculosis, an HIV-infected health care professional could reasonably be determined to pose a high probability of substantial harm to herself.[203] While there is limited jurisprudence to support the EEOC's position, the language of the statute refers only to "a significant risk to the health or safety of others that cannot be eliminated by reasonable accommodation."[204] Moreover, the premise of disability law is the equal treatment of persons with disabilities. As a general matter, the Act rejects paternalistic assumptions that employers or others can decide for persons with disabilities what is in their best interests.[205] Provided that the person with the disability does not pose a significant risk to

198. See text accompanying notes 185-86.

199. See text accompanying note 61.

200. See Rorie Sherman, *TB Hysteria, Repeated?*, 14 Natl L J 1, 32 (June 29, 1992); Sanford F. Kuvin, *Control of TB Depends on AIDS Testing*, NY Times A24 (Apr 1, 1992) (letter to the editor).

201. See Gostin, *Impact of the ADA* at 177, 183-84 (cited in note 188); Gostin, 3 Health Matrix at 111-20 (cited in note 187).

202. 29 CFR § 1630.2(r).

203. See note 45.

204. 42 USC § 12111(3).

205. See 42 USC § 12101(b) (The purpose of the ADA is to "provide a clear and comprehensive national mandate for the elimination of discrimination against individuals with disabilities."). See also Leonard S. Rubenstein, *Mental Disorder and the ADA*, in Gostin and Beyer, eds, *Implementing the ADA* at 209, 216 (cited in note 188).

other workers or to patients, respect for the person's autonomy suggests that HIV-infected workers ought to be permitted to assume the personal risk of M. TB infection. In other civil rights contexts, the Supreme Court has recognized that the beneficence of an employer's purpose does not undermine the conclusion that an adverse employment decision against a qualified worker is discriminatory.[206] It is the essence of antidiscrimination law that decisions about the welfare of qualified workers ought to be made by, not for, the individuals themselves.

One obvious difficulty with this analysis is that HIV-infected health care workers could appear to use the ADA both as a sword and a shield. In effect, persons with disabilities have to argue that the direct threat standard does not include a danger to themselves so that they are shielded from employer decisions to exclude them from the health care workplace. At the same time, they have to argue that the ADA could be used as a sword to require reasonable accommodations to avert a direct threat to their own health. While some may protest that persons with disabilities cannot have it both ways, there are reasonable grounds for this assertion. The ADA is itself paradoxically designed to provide both equal and special treatment for persons with disabilities.[207] In requiring equal treatment, the Act could reasonably require employers not to discriminate against qualified workers if they do not pose a significant risk to others. In requiring special treatment, the Act could reasonably require employers to provide reasonable accommodations to make the workplace safer for persons with disabilities. Accordingly, a legal policy that both prohibits employers from forcibly imposing safety requirements and allows individuals with disabilities to request accommodations for their own safety is not inconsistent with the equal\special treatment mandate of the ADA.

III. Compelling Behavior Change: Powers and Duties of the State and Individual Responsibility

The government can assert a compelling objective in controlling the spread of infection and the growth of resistant strains of tubercle bacilli. Requiring individuals with tuberculosis to engage in conforming behavior is central to the state's interests. From the state's perspective, a sporadic or incomplete course of medication is worse than no treatment at all because it fosters the development of drug resistance. The state has wide authority to encourage or coerce change in behavior. The state, however, frequently chooses compulsion over voluntarism—e.g., mandatory testing, screening, physical examination, reporting, directly observed therapy, isolation, and civil commitment.

While compulsory interventions have been widely employed throughout this century, they have seldom been examined in a modern legal era founded on the constitutional protection of liberty interests and assurance of procedural due

206. See *Automobile Workers v Johnson Controls*, 499 US 187 (1991).

207. See Chai R. Feldblum, *Employment Protections*, 69 Milbank Q 81 (1991).

process.[208] Nor have these interventions been adequately considered in light of modern civil rights doctrine, principally disability law protection of persons with infectious disease. This section uses modern constitutional law, as well as disability law, as a lens to examine the use of compulsory state interventions to control the resurgent tuberculosis epidemic. The goal is to achieve maximum societal effectiveness against tuberculosis because of the striking potential of the disease to affect the morbidity and mortality of the population. At the same time, interventions must be measured against accepted constitutional and disability theory and case law. Public health law has long struggled with these two potentially opposing approaches—deference to state police powers designed to impede the threat of disease epidemics to civil libertarian concerns with the freedom, autonomy, and privacy of individuals.[209]

For much of its history, public health law presented few challenging problems, with courts largely deferring to medicine in decisions about the exercise of compulsory powers.[210] The paradigmatic use of compulsion was, at its core, rather simple. If an individual was currently contagious, government had the undeniable authority to separate that person from others and to provide necessary treatment.[211] But the legal challenges posed in modern public health practice are far more complex. Here, I examine several theoretical problems concerning the exercise of compulsory powers in contemporary public health. The initial inquiry concerns the authority of the state to exercise compulsion against individuals who are infected with M. TB but are not currently contagious and pose no immediate threat to the public health. The second inquiry concerns the authority of the state to exercise compulsion against an entire class of individuals where some, but not all, members of the class pose a future risk to the public health. The final inquiry concerns the extent to which the state must exhaust less

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208. Notable exceptions include the excellent work of the following scholars: Wendy E. Parmet, *AIDS and Quarantine: The Revival of an Archaic Doctrine*, 14 Hofstra L Rev 53 (1985); Wendy E. Parmet, *Health Care and the Constitution: Public Health and the Role of the State in the Framing Era*, 20 Hastings Const L Q 267 (1993); Scott Burris, *Rationality Review and the Politics of Public Health*, 34 Vill L Rev 933 (1989); Deborah Jones Merritt, *Communicable Disease and Constitutional Law: Controlling AIDS*, 61 NYU L Rev 739 (1986). For more recent scholarship focused on the tuberculosis epidemic, see Carlos A. Ball and Mark Barnes, *Public Health and Individual Rights: Tuberculosis Control and Detention Procedures in New York City*, 12 Yale L & Policy Rev 38 (1994); Josephine Gittler, *Controlling Resurgent Tuberculosis: Public Health Agencies, Public Policy, and Law*, 19 J Health Pol Policy & L 107 (1994); Rosemary G. Reilly, *Combating the Tuberculosis Epidemic: The Legality of Coercive Measures*, 27 Colum J L & Soc Probs 101 (1993).

209. See, for example, *Jardine v City of Pasadena*, 199 Cal 64, 248 P 225, 226 (Cal 1926) (In a private nuisance action brought against the city for the establishment of an isolation hospital, the court observed: "[I]t is almost inevitable, since the very foundation of the police power is the control of private interests for the public welfare, that the public rights will come into conflict with private rights.").

210. See Gostin, 3 Health Matrix at 89, 91-92 (cited in note 187).

211. See generally Lawrence O. Gostin, *The Future of Public Health Law*, 12 Am J L & Med 461 (1987).

intrusive interventions before resorting to compulsion. These theoretical problems are discussed in the abstract, but clearly their resolution may vary depending on the intrusiveness of the state intervention.[212] Accordingly, after examining these theoretical issues, they are applied to the classical forms of tuberculosis control—detention (including isolation and civil commitment), administration of therapy under direct observation, and compulsory treatment.

A. Compulsory State Intervention against Persons Infected with M. TB Who Pose No Immediate Risk to the Public

Since the *raison d'etre* of public health statutes is to protect the welfare of the community, it may not be surprising that the law often confines itself to conditions that pose immediate risks to others. However, from a public health perspective, interventions against individuals who are currently non-infectious paradoxically may be far more important than interventions against the infectious. Persons with active tuberculosis are gravely ill and will seldom refuse to remain isolated and take their prescribed medication. If persons with active clinical disease do not cooperate with medical advice, health officials undeniably have the power to force their compliance. Persons with M. TB who are non-symptomatic, however, are less likely to comply, not only because they feel well but also because of the long period of time it takes to complete a course of preventive or curative treatment. Their failure to complete treatment risks reactivation at a time when they are unsupervised in the community, perhaps in a crowded tenement, shelter, or prison. It also substantially increases the probability that the reactivated disease will be drug-resistant. The theoretical dilemma that emerges is whether the state can compulsorily intervene in cases based upon an undifferentiated assessment of future risk.

On the assumption that the courts would require public health regulation to be in conformity with the ADA,[213] the central question for consideration is whether intervention against persons who are non-infectious meets the direct threat standard. Several of the criteria for direct threat, originally established by the Supreme Court in *School Board of Nassau County v Arline*,[214] contemplate circumstances where the individual is contagious: "mode of transmission" suggests a current capability of transmitting infection; "probability of risk" suggests an imminent likelihood of transmitting infection; and "duration of risk" suggests that interventions are unlawful once the person is no longer contagious.[215] Indeed, one of the factual inquiries required by the Supreme Court in *Arline* was whether the school teacher "was contagious at the time she was

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212. For example, in upholding a New York City regulation requiring teachers and other school employees to be tested for tuberculosis, one court emphasized the non-invasive nature of the procedure. *Conlon*, 59 NYS2d at 57.

213. In another paper, I assess the applicability of the ADA to the exercise of public health powers. Gostin, 3 Health Matrix at 103-107 (cited in note 187).

214. 480 US 273 (1987).

215. *Arline*, 480 US at 288.

discharged."[216]

While traditional public health law inquiries are principally concerned with present infectiousness, there is no reason to limit the significant risk doctrine in this way. Significant risks ought to include hazards that are reasonably foreseeable.[217] The ADA attempts to balance legitimate safety concerns with its goals of protection of persons with disabilities from unwarranted discrimination.[218] The government's duty to protect the health of citizens placed at risk of foreseeable harm is as strong its duty to protect against more imminent transmission of infection.

In constitutional adjudication, courts would be equally, or more, likely to uphold compulsory interventions based upon a reasonable assessment of future harm given the highly deferential approach. There have been communicable disease cases where courts have required persons to be actually infectious to be subject to isolation or quarantine.[219] These cases, however, are distinguishable because the individual was completely deprived of liberty and there was little evidence that those detained were a danger to the public health—either currently or in the future. In any case where the state could demonstrate a rational nexus between a relatively unintrusive intervention such as directly observed therapy and the likely reduction in future harm to the public, there appears to be no judicial propensity to interfere with reasonable medical judgments.

The constitutional or disability-based rule authorizing compulsion to avert a foreseeable harm requires reasonably accurate predictions of future dangerousness. However, if the state can demonstrate through objective data that the person is likely to develop or reactivate clinical disease, there is no reason why it could not intervene to prevent the future risk to the public.

B. Separating the Dangerous from the Non-Dangerous: Directing Compulsion against a Class of Persons with Tuberculosis

While science often possesses a veneer of credibility, careful inquiry shows that predictions of future harm are fraught with uncertainty and inaccuracy. There may well be instances where past behavior provides a coherent justification for the imposition of coercion. However, in most cases health officials simply are unable to accurately determine whether an individual will comply with medical advice. Under these circumstances, many will claim that the public health requires taking action against an entire class. To some, this class includes groups thought less likely to cooperate with health providers—for example, persons with mental illness, drug dependency, no stable housing, or no access to

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216. Id.

217. See *Peoples v City of Salina*, 1990 US Dist LEXIS 4070 (upholding termination of employee to avoid a future sickle cell crisis affecting the health of the worker and others).

218. US Department of Justice, *Annotated Regulations for Title II*, 28 CFR § 35 App A at II-28 (1994).

219. See *In re Martin*, 83 Cal App 2d 164, 170, 188 P2d 287, 291 (Cal Ct App 1948); *State v Snow*, 230 Ark 746, 324 SW2d 532 (1959).

private health care.[220] Using these characteristics as a proxy for recalcitrant behavior is highly problematic. First, status characteristics are unreliable predictors of future complex behavior.[221] Second, status classifications are likely to be overbroad, with many individuals in the class willing and able to conform.[222] Finally, these surrogate markers for uncooperative behavior probably will include in the group of persons subject to coercion a disproportionate number of racial minorities and impoverished individuals.[223]

Conscious of these inequities, public health experts have concluded that appropriate interventions ought to be directed against an even wider class—i.e., all persons diagnosed with active tuberculosis until they have completed a full course of treatment.[224] It may well be possible to objectively demonstrate that the class as a whole presents a foreseeable risk to the public. The problem from the perspective of legal theory is that many members of the class subjected to compulsion pose no danger at all. The question arises whether compulsion can be visited upon an individual simply by virtue of her inclusion in a class composed of some dangerous persons absent an individualized assessment of significant risk.

This conceptual problem is fraught with difficulty whether viewed from the perspective of disability law or constitutional law. Perhaps the most revered principle under antidiscrimination law is the requirement to make individualized determinations of person's qualifications or eligibility.[225] To free the individual from the biases frequently associated with membership in the class, it is central to civil rights doctrine that each person must be assessed according to his or her own characteristics.

Given the unequivocal requirement for individualized assessments of risk, what recourse does the state have when, despite its best efforts, it is not able to reliably separate the perceived from the truly dangerous? This becomes a formi-

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220. See Sue Etkind, et al, *Treating Hard-to-Treat Tuberculosis Patients in Massachusetts*, 6 Semin Respir Infect 273, 275 (1991); Esther Sumartojo, *When Tuberculosis Treatment Fails: A Social Behavioral Account of Patient Adherence*, 147 Am Rev Respir Dis 1311, 1312-14 (1993).

221. See text accompanying notes 267-74.

222. See US Congress, Office of Technology Assessment, *Continuing Challenge* at 25 (cited in note 35).

223. A New York Department of Health study of the use of detention orders from 1988 to 1991 found that ninety-one percent of persons confined were African American or Hispanic, fifty-two percent were homeless, and seventy-nine percent were substance abusers. Mireya Navarro, *New York City to Detain Patients Who Fail to Finish TB Treatment*, NY Times A1, B3 (Mar 10, 1993).

224. See Dubler, et al, *A Report from the Working Group on TB and HIV* at 24-25 (cited in note 18).

225. See US Department of Justice, *Annotated Regulations for Title II* at II-27 (cited in note 218) ("The determination that a person poses a direct threat to the health or safety of others may not be based on generalizations or stereotypes about the effects of a particular disability. It must be based on an individualized assessment, based on reasonable judgment that relies on current medical evidence or on the best available objective evidence . . . .").

dable dilemma when the state is capable of demonstrating that the class as a whole does pose a significant health threat and where the intervention proposed is both effective and non-draconian.[226]

The inflexible requirement for individualized inquiries was rejected in *Traynor v Turnage*,[227] where the Supreme Court concluded that the Veterans' Administration did not violate the Rehabilitation Act by characterizing primary alcoholism as "willful" misconduct.[228] Even though all persons within the class of alcoholics had not engaged in willful misconduct, the Veterans' Administration was entitled to rely on a reasonable agency rule.[229] Chief Judge (now Justice) Breyer read *Traynor* as holding the following:

> [A]n agency, in treating handicapped persons, may sometimes proceed by way of general rule or principle, at least where 1) the agency behaves reasonably in doing so, 2) a more individualized inquiry would impose significant additional burdens upon the agency, and 3) Congress, as well as the agency, has expressed some kind of approval of the general rules or principles concerned.[230]

In *Ward v Skinner*, the First Circuit held that the Department of Transportation reasonably relied upon general task force recommendations in denying a license to a truck driver with a history of epilepsy without making further individualized inquiries. Reliance on a generalized rule was upheld despite evidence that the driver took anticonvulsant drugs, had had no seizures for seven years, and had an exceedingly low risk of a seizure.[231]

The Health Department arguably could justify status-based determinations under the standard set in *Traynor* and *Ward* by showing that it acted reasonably by reference to objective scientific standards; that individual assessments of risk for the entire class would be disproportionately burdensome or even scientifically inconceivable;[232] and that there was clear authority in state statutes or health regulations.

It is not necessary to agree with the judicial decisions in *Traynor* and *Ward*[233] or even to agree generally with the principle of status-based determina-

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226. Clearly, the state could not impose severe limitations on the freedoms of an entire class (e.g., by isolation for extended periods) in the absence of an individual determination of dangerousness for each subject. See text accompanying notes 275-82.

227. 485 US 535 (1988).

228. Id at 551-52.

229. Id at 550-51.

230. *Ward v Skinner*, 943 F2d 157, 162 (1st Cir 1991).

231. Id at 161-64.

232. See Margaret A. Hamberg and Thomas R. Frieden, *Tuberculosis Transmission in the 1990s*, 330 New Eng J Med 1750 (1994).

233. A strong case can be made that both *Traynor* and *Ward* were wrongly decided. In *Traynor*, plaintiffs produced credible scientific evidence that twenty percent to thirty percent of all cases of alcohol dependency were due to mental illness. Individualized inquiries in which psychiatric evidence was examined would have been both possible and not unduly burdensome. *Traynor*, 485 US at 550. In *Ward*, the plaintiff produced credible

tions[234] to conclude that in the narrow circumstances posited here proceeding against the class is warranted. The case of DOT is distinguishable from most other uses of status-based determinations because the invasion of autonomy for the individual is not extreme, the person benefits from the treatment, and the intervention is justified by a demonstrable benefit to the public health.

The requirement of individualized determinations is also inherent in the doctrine of overbreadth found in Fourteenth Amendment and other constitutional jurisprudence.[235] Yet, constitutional analysis would likely be consistent with the disability-based conclusions suggested above. The requirement of narrowly tailored interventions is characteristically found in cases where the court engages in strict scrutiny.[236] To the extent that the state deprives individuals of liberty, such as in a status-based isolation rule, it is likely the courts would carefully examine obvious over-inclusion.[237] Yet, where the state strikes at a liberty interest that is less fundamental, such as in a requirement of DOT, it is more likely the court would engage in an interest balancing approach.[238] Given the considerable health interest asserted by government, the courts' natural inclination to defer to medical judgments, and the relatively unintrusive nature of the requirement, claims based on the Fourteenth Amendment are not likely to succeed.

C. Exhaustion of Less Intrusive Means as a Condition Precedent to the Use of Compulsion

Even if the use of compulsion in the tuberculosis epidemic is likely to be efficacious and not overly invasive, advocates argue that it is ethically and legally necessary to exhaust less intrusive means (including the affirmative provision services) before resorting to coercion.[239] The central message of advocacy groups is compelling. It is not necessary to excuse economically disadvantaged and socially marginalized people from any responsibility for protecting their own

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evidence that the risk of a seizure for him was lower than for persons not diagnosed as having epilepsy. *Ward*, 943 F2d at 159.

234. In most other contexts, status-based determinations are highly inequitable, such as when persons in the class may be subject to harsh consequences such as detention on civil or criminal grounds. See Lawrence Gostin, *The Politics of AIDS: Compulsory State Powers, Public Health, and Civil Liberties*, 49 Ohio St L J 1017 (1989).

235. See Laurence H. Tribe, *American Constitutional Law* 1022-39 (Foundation, 2d ed 1988).

236. See *City of Cleburne v Cleburne Living Ctr*, 473 US 432 (1985). See also Tribe, *Constitutional Law* at 1446-1457.

237. See *Shapiro v Thompson*, 394 US 618 (1969).

238. See *Washington v Harper*, 494 US 210 (1990).

239. See Comment, *The TB and HIV Epidemics: History Learned and Unlearned*, 21 J L Med & Ethics 376 (1993); Comment, *Legal Advocacy in a Time of Plague*, 21 J L Med & Ethics 382 (1993); Dubler, et al, *A Report from the Working Group on TB and HIV* at 30-32 (cited in note 18). See also AIDS in Prison Project Correctional Association of New York, et al, *Developing a System for TB Prevention and Care in New York City* (Sept 1992).

health and the public health to understand that they face formidable barriers outside of their control.

Because of the difficulty of compliance with medical advice by many underserved populations, advocates do not accept the imposition of coercion in the absence of services. The exact contours of the argument for the least restrictive alternative are not always clear; the precise form of the contention could well determine its chances of success in law. Must the government merely utilize less restrictive means before resorting to deprivation of liberty—for example, requiring directly observed therapy before issuing a detention order? Must the government offer economic incentives before compelling cooperation with treatment regimens—for example, providing "enablers" such as small cash payments, child care, transportation allowance, or food? Or, must the state provide health, housing, and social services as a condition precedent to coercion—for example, providing stable housing, treatment for mental illness, drug or alcohol dependency, or nutrition programs?

Advocates astutely observe that "passage of coercive laws is cost-free, while resource constraints will limit the ability to offer the services ostensibly mandated by a 'treatment to cure' imperative."[240] Targeting vulnerable patients with compulsion is certainly politically easier than placing duties on government to provide a comprehensive network of housing, social support, and incentives to complete treatment. Tolerating the use of compulsion in the absence of services, moreover, implicitly accepts the flawed argument that the responsibility for noncompliance lies wholly with the individual and not the state. Yet, it is possible to accept the contention that states ought to provide a range of services and incentives for tuberculosis patients, without agreeing that in any individual case the provision of those services must be a condition precedent to the use of compulsion.

The principle of the least restrictive alternative can be found in disability law and constitutional law, as well as in reasoned ethical assessments in public health. While a modest claim that the state utilize less restrictive means, such as DOT, prior to depriving a person of liberty stands a chance of success, claims for the affirmative provision of services will be difficult to sustain. Public or private agencies accountable under the ADA may incur some responsibility to provide reasonable accommodations or modifications to avert a significant risk of harm before discriminating against a person with a disability.[241] However, reasonable accommodations do not require fundamental restructuring of programs or undue hardships.[242] Health departments may not have the resources to provide comprehensive services, nor may they have appropriate jurisdiction. For example, the provision of welfare benefits or housing may be outside the jurisdiction of health departments. Further, courts have been highly reluctant to use disability law as

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240. Dubler, et al, *A Report from the Working Group on TB and HIV* at 31 (cited in note 18).

241. *Arline*, 480 US at 287 n 17.

242. See *Southeastern Community College v Davis*, 442 US 397, 410-11 (1979).

a wedge to require the expenditure of resources, which is thought to be more of a political than a judicial judgment.[243]

Least drastic means analysis can also be found in constitutional jurisprudence.[244] Yet, it would be a mistake to believe that this doctrine would even be relevant to these cases, let alone required in the fact situations posited. Like the doctrine of overinclusion, least drastic means analysis is usually reserved for cases where the court is engaging in more focused scrutiny. Courts rarely engage in careful explorations of alternatives in the absence of a finding that a suspect class has been targeted or a fundamental right implicated. The most developed expression of the constitutional right to less drastic means is found in mental health jurisprudence where some courts have placed the burden on states to demonstrate why community-based settings are not suitable as an alternative to civil commitment.[245] Under theories analogous to mental health, a persuasive claim could be made that health departments would have to attempt less restrictive means that were at least as effective, such as DOT, before detaining a person with tuberculosis.

While the less drastic means doctrine has been used as a limitation on the power of government, it has rarely provided a constitutional vehicle for requiring the state to provide economic incentives, benefits, or services. Even in the mental health context, the Supreme Court has never expressly found an affirmative duty to provide treatment.[246] In contexts ranging from funding for abortions[247] to the provision of child welfare services,[248] the Supreme Court has steadfastly refused to interfere with legislative and executive decisions about the allocation

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243. See *Davis*, 442 US at 410-11 (holding the Rehabilitation Act does not require substantial adjustments in existing programs beyond those necessary to eliminate discrimination); *Williams v Secretary of the Exec Office of Human Serv*, 414 Mass 551, 1993 Mass LEXIS 122 (rejecting ADA claim by homeless persons with mental illness seeking to require Department of Mental Health to provide specific housing services). But see *Martin v Voinovich*, 840 F Supp 1175 (S D Ohio 1993) (declining to dismiss complaint of persons with mental retardation contending that they could not live in the community because the state failed to create sufficient housing options to meet their needs).

244. See *Shelton v Tucker*, 364 US 479 (1960).

245. See *Lessard v Schmidt*, 349 F Supp 1078 (E D Wis 1972); *Covington v Harris*, 419 F2d 617 (DC Cir 1969). See also David Chambers, *Rethinking the Substantive Rules for Custody Dispute in Divorce*, 83 Mich L Rev 477 (1984).

246. The Supreme Court perhaps came closest to finding a right to treatment in the Constitution in *O'Connor v Donaldson*, 422 US 563 (1975). Yet, the court merely concluded that the state cannot detain a non-dangerous mentally ill person "without more." Id at 576. The case could be taken to establish the proposition that, were the state to continue to confine a non-dangerous individual, it would have to provide some form of treatment. The state may also have the obligation to provide habilitation services to a civilly-committed person to prevent a deterioration in his or her condition. See *Pennhurst v Pennhurst State Sch and Hosp*, 465 US 89 (1984).

247. See *Harris v McRae*, 448 US 297, 316 (1980) ("[I]t simply does not follow that a woman's freedom of choice carries with it a constitutional entitlement to the financial resources to avail herself of the full range of protected choices.").

248. See *DeShaney v Winnebago Cty Dept of Social Serv*, 489 US 189 (1989).

of scarce resources. For most courts, the choice of which social program warrants government spending remains a preserve of politically accountable branches of government.

From an ethical perspective, government could not be asked to forego practical measures necessary to avert a significant health risk while waiting for the provision of ample services and incentives. The New York City Health Department aptly argued that it could not be required "to exhaust a pre-set, rigid hierarchy of alternatives that would ostensibly encourage voluntary compliance, but then be compelled to wait for the patient to fail each of them, regardless of the patient's individual circumstances and regardless of the potentially adverse consequences to the public health."[249]

The duty of government to protect the public may require the provision of a range of services and incentives, voluntaristic approaches such as counseling and education, and the exercise of compulsion when necessary to protect the public. Conditioning the use of coercion on the prior use of other alternatives ultimately could result in greater, not lesser, danger to the public.

Vociferous objections to the introduction of coercive measures in the HIV epidemic re-awakened interest in the rationale for tuberculosis control, and several perceptive scholarly analyses have emerged.[250] In the following discussion, I apply the theoretical and legal analysis discussed above to the three most analytically difficult tuberculosis control measures—detention, treatment, and directly observed therapy.

D. COMPULSORY DETENTION

Modern constitutional review utilizes more focused scrutiny where the state deprives a person of liberty. Accordingly, where the state isolates[251] a person

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249. Memorandum from Kelly Henning, Acting Deputy Commissioner, for the Attention of the Board of Public Health, *Response to Public Comments Concerning Proposed Amendments to Section 11.47 of the Health Code* 7 (Mar 2, 1993) (on file with author). Accordingly, § 11.47(f)(1)(iii) of the Code requires the Health Department to set forth in its detention order "the less restrictive treatment alternatives that were attempted and were unsuccessful and/or less restrictive treatment alternatives that were considered and rejected, and the reasons such alternatives were rejected." This language, while not mandating a hierarchy of alternatives, requires the Department to detail its attempts to promote completion of treatment through voluntary or less restrictive means. Id at 8.

250. Ball and Barnes, 12 Yale L & Policy Rev 38 (cited in note 208); Gittler, 19 J Health Pol Policy & L 107 (cited in note 208); Reilly, 27 Colum J L & Soc Probs 101 (cited in note 208).

251. Isolation is defined as separation of a person known to have a currently contagious condition (usually transmitted through the airborne route) from others during the period of contagion. This is to be distinguished from quarantine, which involves separation of persons who have been exposed to disease, but not known to be infected or contagious, for a period of time necessary to determine if they have been infected and are contagious. Many early cases supported the use of quarantine. See, for example, *Compagnie Francaise De Navigation v State Bd of Health*, 51 La Ann 645, 25 S 591 (1899) (upholding state statute that authorized the regulation of contagious and infectious diseases, under which

with active disease, issues a detention order, or institutes civil commitment proceedings against persons with M. TB, it will have to demonstrate that it has a considerable public interest; provides fair procedures for determining dangerousness; avoids interventions that are arbitrary or over-broad; that the governmental interest cannot be achieved by less intrusive means; and shows that the effectuation of the governmental interest is health-related and non-punitive.[252]

1. The strength of the governmental interest.

In order to withstand constitutional scrutiny of the confinement of a person with tuberculosis, the state must demonstrate that it has a substantial governmental interest.[253] Confinement of persons with mental illness under civil commitment provides an apt analogy to tuberculosis detention because the *raison d'etre* of the intervention is non-criminal and based upon the health and safety

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the health "board has authority to prohibit the introduction into an infected locality of persons coming from any place, whether or not such persons or place are infected"); *Ex parte Culver*, 187 Cal 437, 202 P 661 (1921) ("There can be no doubt but that . . . the state board of health has power to order the quarantine of persons who have come in contact with cases and carriers of contagious diseases 'whenever in the judgment of the said board such action shall be deemed necessary to protect and preserve the public health.'"); *Crayton v Larabee*, 220 NY 493, 116 NE 355 (1917) (upholding power of health department to quarantine woman in her home adjoining a house where a person was ill with smallpox even though there was no finding that she was actually exposed to the disease).

252. A recently amended New York City Health regulation illustrates how each of the foregoing elements of constitutional review can be incorporated into a tuberculosis statute. The Code requires the Commissioner to "prove the particularized circumstances [including recent behavior] constituting the necessity for detention by clear and convincing evidence"; a statement of "the less restrictive treatment alternatives that were attempted and were unsuccessful and/or . . . were considered and rejected, and the reasons such alternatives were rejected"; appointment of counsel and a due process hearing; and detention in a secure setting designed for the treatment of tuberculosis. The Code was amended expressly to articulate the standards for compulsory powers and to ensure sound principles of procedural due process and respect for civil liberties. Memorandum from Kenneth R. Ong, Deputy Commissioner for Disease Prevention to the Attention of the Board of Health, *Request to Amend Section 11.47 Health Code* 1 (Oct 6, 1992) (on file with author). See Ball and Barnes, 12 Yale L & Policy Rev at 61-66 (cited in note 208); Navarro, NY Times at A1 (Mar 10, 1993) (cited in note 223) (describing New York City's plans for long-term detention-until-cure of patients who have shown a pattern of ending treatment when they are released).

253. While most courts and commentators invoke the police powers, at least one court has alluded to the *parens patriae* doctrine as a justification for detention of persons with tuberculosis, since the individual benefits from treatment. *Snow*, 324 SW2d at 534. However, in the absence of some showing that the individual is incompetent to make decisions necessary for his or her own best interests (e.g., by reason of young age, mental illness, or mental retardation), the *parens patriae* doctrine may not provide a viable constitutional rationale for confinement. See *Rivers v Katz*, 67 NY2d 485, 494-98, 495 NE2d 337, 342-44 (NY 1986) (holding the sine qua non for state's use of *parens patriae* power as justification for forceful administration of drugs is the determination that the individual lacks capacity to decide for himself).

of the individual and the community.[254] In mental health cases, the Supreme Court has provided indirect support for the requirement of finding dangerousness as a prerequisite to commitment.[255] In *O'Connor v Donaldson*, the Supreme Court held that, without providing treatment or some other sufficient service, the state could not confine non-dangerous persons who are capable of surviving in the community.[256] Several lower courts have gone further in requiring a finding of recent overt behavior to demonstrate a significant risk to others.[257]

It is relatively easy to find sufficient evidence of dangerousness in cases where a person with active tuberculosis is confined during a brief period until treatment renders the person non-contagious.[258] A single individual with infectious tuberculosis can account for dozens of active cases, as well as hundreds of tuberculosis infections.[259]

A substantial number of cases in the early to middle part of this century upheld isolation orders for persons with contagious tuberculosis[260] and other

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254. This analogy is directly made by the court in *Greene v Edwards*, 164 W Va 326, 328, 263 SE2d 661, 662 (1980) ("It is evident from an examination of this statute that its purpose is to prevent a person suffering from active communicable tuberculosis from becoming a danger to others. A like rationale underlies our statute governing the involuntary commitment of a mentally ill person.").

255. *Humphrey v Cady*, 405 US 504 (1972); *Donaldson*, 422 US 563.

256. 422 US at 575. At least one post-*Donaldson* court has held that the civil commitment of the mentally ill without treatment is not necessarily an impermissible exercise of governmental power. *Morales v Turman*, 562 F2d 993, 998 (5th Cir 1977).

257. See, for example, *Suzuki v Yuen*, 617 F2d 173 (9th Cir 1980); *Colyar v Third Judicial D Ct for Salt Lake Cty*, 469 F Supp 424 (D Utah 1979).

258. Despite effectuation of the goal of isolating the patient during the period of contagiousness, short-term detention may not assure the completion of a full treatment regimen. Small-scale studies suggest that most patients fail to take the full course of their medication after discharge from short-term detention, rendering them susceptible to reactivation tuberculosis. Catherine Woodard, *Detentions Don't Work: Holding TB Patients Can't Assure Cure*, NY Newsday 6 (Jan 23, 1992) (describing a New York City study that found that only one of thirty-three patients detained since 1988 took medication long enough to be cured).

259. Hamberg and Frieden, 330 N Eng J Med 1750 (cited in note 232). See also Peter M. Small, et al, *The Epidemiology of Tuberculosis in San Francisco—A Population-Based Study Using Conventional and Molecular Methods*, 330 N Eng J Med 1703 (1994); David Alland, et al, *Transmission of Tuberculosis in New York City: An Analysis by DNA Fingerprinting and Conventional Epidemiologic Methods*, 330 N Eng J Med 1710 (1994).

260. See *Application of Halko*, 54 Cal Rptr 661 (Cal Ct App 1966) (holding that consecutive orders of detention for person with M. TB do not deprive person of due process of law as long as health officer has reasonable grounds to believe that the person is dangerous to public health); *Moore v Draper*, 57 S2d 648 (Fla 1952) (upholding constitutionality of statute authorizing the detention of person with infectious TB but stating that when person feels he is cured or that the disease is arrested so he is not a danger to society, he may seek release); *Moore v Armstrong*, 149 S2d 36 (Fla 1963) (finding that plaintiff had not been deprived of his civil rights during periods of isolation for his misconduct while confined in state hospital for treatment of infectious TB); *Snow*, 324 SW2d at 534 (holding that if the state can demonstrate that person has infectious TB and refuses treatment, it can confine the individual).

communicable[261] or sexually transmitted[262] diseases.[263] While in many of these early cases health officers merely had "reasonable suspicions" that the person had a contagious condition, short-term detention could be justified under modern constitutional doctrine only with credible scientific evidence that the person was infectious.[264] In *State v Snow*,[265] for example, the court would not uphold a detention order where there was no diagnostic procedure, x-ray, or sputum test ever conducted on the patient.

Short-term detention of persons, consistent with extant constitutional standards of dangerousness, requires merely a status-based determination that the person has active tuberculosis. The burden of the state, however, is greater in cases of longer-term detention of the currently uninfectious.[266] Here, the state must demonstrate more than current health status; it must show that the individual poses a future danger to others by virtue of his or her predicted failure to take the full course of prescribed medication. As recently as 1966, a California court, in *In re Halko*, found no deprivation of due process when a detention order for tuberculosis treatment was renewed four times. The court required the health officer only to have reasonable grounds for the belief that the individual was "dangerous to the public health."[267] The more recent case of *In re appli-*

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261. See *State v Rackowski*, 86 A 606 (Conn 1913) (holding that before a person can be isolated, the state must prove that a health officer had reasonable grounds to believe she was infected with the contagious disease scarlatina or scarlet fever); *Kirk v Wyman*, 65 SE 387, 390 (SC 1909) (upholding use of police power even though the person posed "hardly any danger of contagion," but refusing to allow her to be confined in a pest house); *People v Robertson*, 302 Ill 422, 134 NE 815 (1922).

262. See *Ex parte Clemente*, 215 P 698 (Cal D Ct App 1923) (finding the health department justified in its detention of woman who engaged in prostitution, which provided reasonable grounds for believing she had a sexually transmitted disease); *Ex parte Martin*, 83 Cal App 2d 164, 188 P2d 287 (1948) (holding a health officer only needs probable cause to confine woman who engaged in acts of prostitution); *State v Hutchinson*, 18 S2d 723, 726 (Ala 1944) (holding that confinement is allowable under police powers where there are reasonable grounds to suspect the person has a contagious or infectious disease but that a charge of vagrancy alone is not enough upon which to rest a reasonable suspicion); *Ex parte Johnston*, 180 P 644, 645 (Cal D Ct App 1919) (upholding the confinement of woman with gonococcus infection even though she was unlawfully arrested and examined); *Varholy v Sweat*, 153 Fla 571, 15 S2d 267 (1943); *Ex parte Company*, 106 Ohio St 50, 139 NE 204 (1922).

263. The level of discretion afforded to health officials is so extensive that tort actions have not succeeded even in the face of decisions to isolate in the absence of an actual disease. See *Jones v Czapkay*, 6 Cal Rptr 182 (Cal D Ct App 1960).

264. See the text accompanying notes 214-20.

265. 324 SW2d at 534.

266. Persons with sputum positive pulmonary tuberculosis which is so drug resistant as to be refractory to treatment are potentially infectious to the general community for an extended period of time. In such cases, status-based determinations of infectiousness may provide a justification for longer-term confinement. See Centers for Disease Control and Prevention, *Improving Patient Compliance in Tuberculosis Treatment Programs* 14 (1989).

267. *In re Halko*, 54 Cal Rptr at 664.

cation of New York City v Doe[268] demonstrates the modern standard of clear and convincing evidence of the "inability to comply with the projected eighteen to twenty-four month prescribed course of medication," based upon a "refusal to cooperate with petitioner's repeated efforts to have her participate in voluntary forms of directly observed therapy."

As the court in *Doe* indicated, the best predictor of future behavior is a recent pattern of similar behavior. Accordingly, inquiries focused on instances where the person has left a hospital against medical advice, refused or was incapable of following a treatment regime, or repeatedly failed to attend scheduled sessions for supervised treatment provide the most accurate measures for assessing the need for compulsion.[269]

Yet, even in *Doe*, the court was also prepared to accept membership in traditionally disfavored groups, at least in part, as evidence of dangerousness: a history of drug abuse and unstable or uncertain housing accommodations. Use of status characteristics to predict non-compliance with medical advice has never been demonstrated to be reliable. Researchers have been unable to identify a set of patient characteristics that permit accurate predictions of who will, and will not, complete treatment even with extraordinary amounts of assistance.[270] Investigators have observed that "socioeconomic status, occupation . . . [and other personal indicators] are not characteristics that predict non-compliance."[271] Additionally, predictions of complex behavior are exceedingly difficult, with efforts among psychiatrists exhibiting low levels of reliability and validity.[272] The inherent problem with the use of personal status as a proxy for dangerous behavior is not only unreliability, but also its high correlation with poverty, race, and ethnicity.[273]

2. Procedural Due Process.

Persons with tuberculosis who are subject to detention are entitled to some

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268. 614 NYS2d 8, 9 (NY Sup Ct 1994).

269. See Ball and Barnes, 12 Yale L & Policy Rev at 54 (cited in note 208).

270. US Congress, Office of Technology Assessment, *Continuing Challenge* at 87 (cited in note 35). See also Sumartojo, 147 Am Rev Respir Dis 1311 (cited in note 220).

271. John A. Sbarbaro, *The Patient-Physician Relationship: Compliance Revisited*, 64 Annals Allergy 325, 326 (1990). See also Stephen E. Weis, et al, *The Effect of Directly Observed Therapy on the Rates of Drug Resistance and Relapse in Tuberculosis*, 330 N Eng J Med 1179, 1182 (1994) ("[A]ge, sex, religion, education, race, and socioeconomic status do not predict compliance.").

272. See Bruce J. Ennis and Thomas R. Litwack, *Psychiatry and the Presumption of Expertise: Flipping Coins in the Courtroom*, 62 Cal L Rev 693 (1974); John Monahan, *The Clinical Prediction of Violent Behavior* (US Dept of Health and Human Serv, 1980); Bernard L. Diamond, *The Psychiatric Prediction of Dangerousness*, 123 U Pa L Rev 439 (1974); Henry J. Steadman and Joseph Cocozza, *Psychiatry, Dangerousness and the Repetitively Violent Offender*, 69 J Crim L & Criminol 226 (1978). In the context of TB, the CDC similarly observed that "[s]tudies have shown . . . that physicians and other health care providers are very unreliable in assessing patient compliance." Centers for Disease Control and Prevention, *Improving Patient Compliance* at 5 (cited in note 266).

273. See notes 34 and 224 and the accompanying text.

individualized determination of their dangerous condition or behavior that is undertaken with reasonable procedural safeguards. As the Supreme Court recognized, there "can be no doubt that involuntary commitment to a mental hospital, like involuntary confinement of an individual for any reason, is a deprivation of liberty which the State cannot accomplish without due process of law."[274] The nature and extent of the process required depends on the nature of the interests affected, the risk of an erroneous deprivation, the value of additional safeguards, and the administrative burdens that additional procedures would entail.[275]

In cases of short-term isolation during a brief period of contagion, the Constitution would not necessarily require prior review due to the urgency of separating the individual from close contacts. Despite judicial fears of contracting M. TB infection,[276] some fact-finding of the person's current infectiousness is required after the initiation of the detention, perhaps at the site of isolation. Reduced expectations of due process are justified by the relatively short period of confinement, the urgent necessity to protect the public, and the difficulty of providing a full panoply of procedural protections.

The Due Process Clause, however, requires considerably more extensive procedures prior to longer-term detention. In the context of civil commitment of persons with mental illness, the Supreme Court required a "clear and convincing" standard of proof of dangerousness,[277] and many lower courts have required an ambitious array of procedural protections as well as the right to legal counsel.[278] The West Virginia Supreme Court in *Greene v Edwards*[279] reasoned that there is little difference between loss of liberty under mental health and public health rationales. A person with tuberculosis, therefore, is entitled to the same procedural safeguards as persons with mental illness facing civil commitment: written notice, counsel, presentation of evidence at a hearing, cross examination, and an appeal. The justification for rigorous procedural protections is found in the fundamental invasion of liberty occasioned by long-term detention;[280] the serious implications of erroneously finding a person dangerous; the

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274. *Donaldson*, 422 US at 580 (Burger concurring). See *Project Release v Provost*, 722 F2d 960, 971 (2d Cir 1983) ("Civil commitment for any purpose requires due process protection.") (citing *Vitek v Jones*, 445 US 480, 491-92 (1980)).

275. *Mathews v Eldridge*, 424 US 319, 335 (1976). See *Morales*, 562 F2d at 998 ("The interests of the individual and of society in the particular situation determine the standards for due process."); *Washington v Harper*, 494 US 210, 229-30 (1990); *Morrissey v Brewer*, 408 US 471, 481 (1972); *Hewitt v Helms*, 459 US 460, 473 (1983).

276. See Richard T. Andrias, *The Criminal Justice System and the Resurgent TB Epidemic*, 9 Crim Justice 2, 52 (1994).

277. *Addington v Texas*, 441 US 418 (1979). In a contemporary tuberculosis detention order case, another court also adopted a clear and convincing standard of proof. *Doe*, 614 NYS2d at 8.

278. *Lessard v Schmidt*, 413 F Supp 1318 (E D Wis 1976); *In re Ballay*, 482 F2d 648 (DC Cir 1973).

279. 263 SE2d 661 (1980).

280. By analogy, involuntary civil commitment to a mental institution has be recognized as a "massive curtailment of liberty." *Vitek*, 445 US at 491-92; *Humphrey v Cady*, 405 US 504 (1972).

value of due process in accurately finding complex facts surrounding the prediction of future dangerous behavior;[281] and the absence of significant administrative or practical problems in providing a hearing.

3. Less drastic means analysis.

Given the deservedly higher level of examination required in cases of deprivation of liberty, government would not be permitted to resort to confinement if it could achieve its objectives through less drastic means. For the reasons explored earlier, government would not have to provide an elaborate array of services to meet the less restrictive means test, such as economic incentives, housing, and health care.[282] However, if the person with tuberculosis would reliably take her medication with supervision in the community, the governmental interest in confinement would be obviated.[283]

E. COMPULSORY TREATMENT

All persons have an interest in deciding upon the medical treatment they will receive. Whether framed as an interest in autonomy, liberty, or privacy, the right to refuse treatment has been found to exist both under state[284] and federal constitutional law.[285] While it is clear that administering medical treatment without the person's consent "represents a substantial interference with that person's liberty,"[286] courts have struggled with substantive and procedural aspects of determining when this liberty interest may be overridden in mental health cases.[287]

With painstaking emphasis on the deference shown to the effectuation of penological interests in prison safety, the Supreme Court held in *Washington v Harper* that the state's interests outweigh those of an inmate where the inmate is dangerous to himself or others and the treatment is in his medical interests.[288] Were the courts to adopt such a standard in relation to patients civilly

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281. See the text accompanying notes 271-73.

282. See the text accompanying notes 240-51.

283. See *Doe*, 614 NYS2d at 9 (implicitly agreeing that less restrictive alternative analysis applies but failing to find it in the facts of the case).

284. See, for example, *Rivers*, 495 NE2d 337.

285. See, for example, *Cruzan v Director, Missouri Dept of Health*, 497 US 261 (1990); *Washington*, 494 US at 229; *Riggins v Nevada*, 112 S Ct 1810, 1814 (1992). Similar conclusions have also been reached under state statute and common law. See, for example, *Rogers v Comm'r, Dept of Mental Health*, 390 Mass 489, 458 NE2d 308 (1983) (holding that a civilly committed mental patient is competent to make treatment decisions until the patient is adjudicated incompetent by a judge).

286. *Washington*, 494 US at 229.

287. "[T]he substantive issue involves a definition of th[e] protected constitutional interest, as well as identification of the conditions under which competing state interests might outweigh it. . . . The procedural issue concerns the minimum procedures required by the Constitution for determining that the individual's liberty interest actually is outweighed in a particular instance." *Mills v Rogers*, 457 US 291, 299 (1982).

288. *Washington*, 494 US at 227.

committed, due process certainly would allow medically appropriate tuberculosis treatment to be administered to avert a danger to the public.[289] Contrariwise, due process would not permit compelled treatment absent a finding of overriding justification (e.g., danger to others) and medical appropriateness (e.g., treatment within the prevailing standards of medical care).[290]

Persons in the community, and even persons civilly committed, might reasonably expect to have their liberty interests in refusing tuberculosis treatment to weigh rather more heavily than under standards set for prison inmates.[291] Yet, the Supreme Court has not made such a determination,[292] and even those lower courts that are highly sympathetic to patients' rights to consent to treatment concede that the state's exercise of the police power overrides individual interests where there is a determination of dangerousness and medical appropriateness.[293]

In mental health discourse, a charged debate has ensued about whether a person who is civilly committed may be given treatment without consent in the absence of a procedural due process finding of incompetence or dangerousness. Many courts and commentators have aptly suggested that the civil commitment process itself provides insufficient justification for a finding of mental incompetence to refuse treatment and that some separate process is required.[294] While the merger of civil commitment and treatment determinations may not be warranted in mental health, it may well be allowable in tuberculosis cases. The preeminent question in cases of tuberculosis is whether medically appropriate tuberculosis treatment is necessary for the protection of the patient and the public;

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289. The Supreme Court, in *Riggins*, observed that due process would be satisfied in connection with the administration of antipsychotic medication for a defendant sentenced to death if it were demonstrated that treatment was "medically appropriate and, *considering less restrictive alternatives*, essential for the sake of Riggins' own safety or the safety of others." 112 S Ct at 1815 (emphasis added). In the context of tuberculosis, the state's interest in ensuring the completion of a regimen of treatment may not always require compulsory treatment or detention. Many individuals would complete their treatment in the community through directly observed therapy with consent or through other less intrusive measures. See text accompanying notes 240-41.

290. *Riggins*, 112 S Ct at 1814-15.

291. See *Youngberg*, 457 US at 321-22. Some courts have gone quite far in recognizing the interests of mental patients who are involuntarily committed by holding that the state must demonstrate an overriding interest that is compelling. *Woodland v Angus*, 820 F Supp 1497, 1509-10 (D Utah 1993). The *Woodland* court used *Riggins* as authority for this conclusion, despite *Riggins*'s explicit denial that it was adopting strict scrutiny. *Riggins*, 112 S Ct at 1815.

292. *Mills*, 457 US 291 (passing the question to Massachusetts courts).,

293. *Rivers*, 495 NE2d at 343 ("Where the patient presents a danger to himself or other members of society or engages in dangerous or potentially destructive conduct within the institution, the State may be warranted, in the exercise of its police power, in administering antipsychotic medication over the patient's objections.").

294. Much of the caselaw and scholarly analysis in this area is surveyed in *Rivers*, 495 NE2d at 342-43. See also Larry O. Gostin, *The Merger of Incompetency and Certification: The Illustration of Unauthorized Medical Contact in the Psychiatric Context*, 2 Intl J L & Psych 127 (1979).

it is the person's inability or unwillingness to follow a course of treatment, not her competency that is at issue in tuberculosis detention.[295] Since the very criterion that must be satisfied for compulsory treatment ought to be determined at the time of detention, a separate due process hearing may not be warranted. Manifestly, when the medication is no longer necessitated by the patient's dangerousness, the confinement itself (as well as the treatment) cannot continue to be justified under the police powers. Accordingly, due process requires some post-commitment access to the courts be it through habeas corpus or routine period judicial renewal of the detention order.

F. Directly Observed Therapy

The state's interest in ensuring the completion of a regimen of treatment may not always require compulsory detention. Treatment in the community can often be assured through directly observed therapy. Directly observed therapy (DOT) is a compliance-enhancing strategy in which each dose of medication is observed by a health care or public health professional, a family member, a peer-advocate, community worker, or other responsible person.[296] The supervision of medication can take place in a variety of different venues, ranging from the individual's personal or group residence or place of employment to a private health care office, a clinic, or even a street corner. The administration of DOT can be structured legally either to require health care professionals to obtain informed consent (voluntary DOT) or to mandate patient compliance (compulsory DOT).

An exploration of the legal justification for compulsory DOT requires a careful balancing of the interests of the individual and the state. While DOT is frequently thought to be a relatively unintrusive action because it does not require confinement,[297] its imposition does affect considerable personal interests in autonomy, dignity, and privacy. The person may have to attend at certain places and times for treatment, interfering with her freedom of movement; treatment may take place in public places known for the treatment of tuberculosis, resulting in stigma or discrimination; or the person may be subject to observation at home, imposing on her privacy.[298]

The interests of the state in mandating DOT against an individual or a population must be sufficiently substantial to override the person's interests in avoiding the use of compulsion. As a general matter, it is easy to construct a formidable case favoring the state's imposition of DOT. There exists considerable

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295. In a concurring opinion in *Riggins*, Justice Kennedy observes that where the purpose of involuntary medication is to insure that the person ceases to be a physical danger to himself or others, the inquiry is both objective and manageable. *Riggins*, 112 S Ct at 1818.

296. US Congress, Office of Technology Assessment, *Continuing Challenge* at 114 (cited in note 35).

297. See, Bayer, Dubler and Landesman, 83 Am J Pub Health at 653 (cited in note 196).

298. See George J. Annas, *Control of Tuberculosis—The Law and the Public's Health*, 328 New Eng J Med 585 (1993).

evidence that significant numbers of persons with tuberculosis do not complete the full course of their medication.[299] Studies have shown treatment "noncompliance" rates ranging from twenty-two to fifty-five percent.[300] From a strict public health perspective, it does not matter whether the principal cause of treatment failure is based upon the inadequacy of health department services,[301] the sheer difficulty of completing a complicated and extended treatment regime, social/psychological/cultural factors beyond the control of patients, or the willful non-compliance of patients. All of these factors probably contribute to treatment failure. What is critical to the legal and ethical assessment of compulsory DOT is that the state can demonstrate that, absent an effective intervention, a significant number of individuals with tuberculosis will not take the full course of their treatment, and many of these individuals will reactivate with a drug-resistant form of infectious disease.

The government can demonstrate, not only that many persons diagnosed with active tuberculosis will not take the full course of their treatment, but that the systematic application of supervised therapy is highly effective in securing completion of treatment. Treatment completion rates of over ninety percent of patients on DOT have been achieved in geographically diverse tuberculosis programs.[302] Universal administration of treatment under direct observation

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299. The scientific and lay literature is replete with gripping illustrations of the health hazard occasioned by treatment failure. See, for example, Centers for Disease Control and Prevention, *Improving Patient Compliance* at 3 (cited in note 266) (In Mississippi, an alcoholic man with pulmonary TB takes treatment irregularly and subsequently infects his wife and son. This sets off an outbreak of drug resistant disease involving at least twelve additional cases, including three deaths, and hundreds of new infections.); Catherine Woodard, *Bitter Medicine to Swallow*, NY Newsday 5 (Mar 8, 1992) (A twenty-eight-year-old man has had infectious TB nine times in last four years and is currently out on the streets after being released from a detention order that was valid only while he was infectious.); Mireya Navarro, *Recalcitrant Patients a Threat as TB Returns*, NY Times A1, B2 (Apr 4, 1992) (A thirty-four-year-old homeless man who repeatedly failed to take medication is forcibly taken to hospital in shackles and chained to the bed.); Mireya Navarro, *Pill Monitors Make Sure TB Patients Swallow*, NY Times A1 (Sept 5, 1992) (A man known as Champagne is watched while he takes fourteen tablets because of his previous failure to comply.); Michael Specter, *TB Carriers See Clash of Liberty and Health*, NY Times A1, B4 (Oct 14, 1992) (A Manhattan woman has been in and out of city hospitals at least five times with active tuberculosis, has been in jail, surfaced in Georgia, gave birth to a daughter, and returned to N.Y.).

300. Centers for Disease Control and Prevention, *Improving Patient Compliance* at 4 (cited in note 266). See also Karen Brudney and Jay Dopkin, *Resurgent Tuberculosis in New York City: Human Immunodeficiency Virus, Homelessness, and the Decline of Tuberculosis Control Programs*, 144 Am Rev Respir Dis 745 (1991); Barry Bloom and C. J. Murray, *Tuberculosis: Commentary on a Reemergent Killer*, 257 Sci 1055, 1060-61 (1992); Whitney W. Addington, *Patient Compliance: The Most Serious Remaining Problem in the Control of Tuberculosis in the United States*, 76 Chest 741 (1979).

301. See the text accompanying notes 241-44.

302. David L. Cohn, et al, *A 62-Dose, 6 Month Therapy for Pulmonary and Extrapulmonary Tuberculosis: A Twice-Weekly, Directly Observed, and Cost-Effective Regimen*, 112 Annals Internal Med 407 (1990); Centers for Disease Control and Prevention, *Approaches to Improving Adherence to Antituberculosis Therapy—South Carolina and New*

dramatically reduces the rates of primary drug resistance, acquired drug resistance, and relapse.[303]

Universal DOT is becoming the standard of care in tuberculosis control.[304] The CDC,[305] clinicians,[306] and expert committees[307] have given support to the concept that all persons diagnosed with active tuberculosis ought to take medication under supervision at least for a period of time to ensure compliance. Universal DOT is justified by the repeated empirical observation that clinicians cannot accurately separate the compliant from the non-compliant; the desire to avoid status-based decisions that would disproportionately burden minority races and the poor; and the evidence of efficacy, together with the uncertainty connected with other voluntary methods to achieve compliance.

Critiques of universal DOT have centered not only on the invasiveness of monitoring therapy, but on the substantial economic costs of directly supervising medication in large numbers of people; it is argued that DOT is unnecessary for patients who are motivated to comply with treatment.[308] This argument begs the question. It is stating the obvious that DOT is unnecessary and wasteful for persons who would have completed treatment without supervision. The problem is that science does not know how to determine who would complete treatment, so the only effective and non-discriminatory course available is to subject the at-risk population to supervision. This cost-effectiveness critique also fails to take into account the substantial economic savings from reductions in rates of relapse, multidrug-resistant relapse, and acquired resistance that would accrue from universal DOT. The economic and human burdens of treating MDR-TB is high, with median hospital stays of over seven months at costs ranging from $100,000 to $180,000 per case.[309]

The fact that universal DOT would be cost effective in combatting the tuberculosis epidemic does not necessarily suggest that compulsion ought to be visited upon all persons diagnosed with active tuberculosis. Further, the fact that the courts probably would uphold population-based DOT without consent does

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York, 1986-1991, 42 Morbid & Mortal Wkly Rep 74 (1993); US Congress, Office of Technology Assessment, *Continuing Challenge* at 89-90 (cited in note 35); Hamberg and Frieden, 330 New Eng J Med at 1751 (cited in note 232).

303. Weis, et al, 330 N Eng J Med at 1183 (cited in note 271).

304. Ronald Bayer and Laurence Dupuis, *Tuberculosis, Public Health and Civil Liberties*, Am Rev Pub Health (forthcoming 1995).

305. Centers for Disease Control and Prevention, *Initial Therapy for Tuberculosis in the Era of Multidrug Resistance: Recommendations of the Advisory Council for the Elimination of Tuberculosis*, 42 Morbid & Mortal Wkly Rep 1 (1993).

306. Iseman, 329 N Eng J Med 784 (cited in note 46).

307. Dubler, et al, *A Report from the Working Group on TB and HIV* at 14-38 (cited in note 18).

308. Annas, 328 N Eng J Med at 587 (cited in note 298). Some also charge that DOT is merely fashionable and politically correct. Kenneth Prager, *A PC Approach to TB Control*, Wall St J A6 (Dec 30, 1992).

309. See Weis, et al, 330 N Eng J Med at 1183 (cited in note 271), and the studies cited therein.

not render it a wise policy. While the CDC does recommend universal DOT, it does not suggest the universal application of compulsion.[310] Additionally, the vast majority of individuals with tuberculosis accept DOT when offered.[311] Consequently, while securing the person's informed consent may not be legally required, the state's interests are not materially compromised by seeking consent in all cases. Compulsory DOT ought to be considered only when the individual has refused voluntary supervision; conceptually, it would be used as a less restrictive alternative to isolation or commitment. Directly observed therapy in the absence of consent would be based on an individualized determination that the person is unable or unwilling to comply with the plan of treatment and poses a significant risk of transmission. Generalizations or stereotypes about the person's class or status such as being poor, homeless, or a drug user would not provide a sufficient basis for DOT without consent. Objective evidence of noncompliance, such as recent behavior, would be required under the significant risk standard.

G. Allocating Responsibility for "Non-compliance": Blaming the Individual and Imposing Duties on the State

The glowing story of scientific achievement in the tuberculosis epidemic, often told, can be highly misleading. In some inner cities in the United States and in developing countries, the treatment success rate is not the ninety-eight percent demonstrated in controlled clinical trials,[312] but as low as fifteen percent or less.[313] Virtually every official publication by government or international agencies attribute the low rate of success to "non-adherence," "non-compliance," "recalcitrance," or "failure" on the part of patients.[314] The attribution of blame to the person who is ill, rather than an acceptance of responsibility on the part of the health agency, masks the true problem with completion of medication.[315]

Certainly, once patients begin to take their medication and feel well within weeks, they may forget or refuse to complete the course of therapy. However, it is genuinely difficult to complete a course of recommended therapy. Several combinations of three or four drugs must be taken over a period of six months for routine therapy. For persons with hard-to-treat cases of MDR-TB, experimentation with combinations of numerous drugs may have to occur over eighteen to thirty-six months.[316] While anti-tuberculosis medication is usually

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310. Centers for Disease Control and Prevention, 42 Morbid & Mortal Wkly Rep at 6 (cited in note 49).

311. See Weis, et al, 330 N Eng J Med 1179.

312. See note 97.

313. See World Health Organization, *Treatment of Tuberculosis* at 3 (cited in note 4).

314. See, for example, Centers for Disease Control and Prevention, 42 Morbid & Mortal Wkly Rep at 6 (cited in note 49); World Health Organization, *Treatment of Tuberculosis* at 1, 19-21.

315. See Mindy T. Fullilove, et al, *Psychosocial Issues in the Management of Patients with Tuberculosis*, 21 J L Med & Ethics 324 (1993).

316. See Iseman, 329 N Eng J Med 784 (cited in note 46).

taken orally, some medications are administered by deep, painful intramuscular injection (streptomycin, INH to critically ill patients).[317] Nor are anti-tuberculosis drugs free from adverse effects. Known adverse effects include hepatitis (INH, RIF, PZA),[318] hypersensitivity (RIF, INH), severe gastrointestinal intolerance (RIF), influenza-like syndrome (RIF), and vertigo or hearing loss (SM).[319] Second-line drugs are generally poorly tolerated and more toxic than traditional medications.[320]

The regimen of antituberculosis therapy, particularly for drug resistant disease, is daunting,[321] a confusing combinations of medications, taken over an extended period of time, with possibly painful administration and potentially severe side effects.[322] This requires a disciplined, planned, and well-supervised program. Taking any prescribed medication over a long period of time is difficult even for those with a structured support network of family members, health care professionals, and stable housing. It is still more difficult for individuals who are homeless, hungry, have inadequate or sporadic health care, and may be dependent on drugs or alcohol or have mental illness.

In addition to the sheer difficulty of completing a course of anti-tuberculosis therapy, there are many social, psychological, cultural, and economic factors that significantly impede a person's ability to systematically take medication over a period of six to twenty-four months.[323] The absence of a stable residence renders it burdensome to attend regularly for treatment; persons with mental illness or alcohol or drug dependency may not be easily capable of following treatment regimens; persons with inadequate health and social support, or are hungry or subject to domestic or other violence may not make routine treatment a priority; and persons with different cultural backgrounds may be unfamiliar

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317. See World Health Organization, *Treatment of Tuberculosis* at 30, 37.

318. See Centers for Disease Control and Prevention, *Severe Isoniazid-Associated Hepatitis—New York, 1991, 1993*, 42 Morbid & Mortal Wkly Rep 545 (1993).

319. See World Health Organization, *Treatment of Tuberculosis* at 27-41.

320. See Iseman, 329 N Eng J Med 784.

321. One account of a quarantined patient with MDR-TB noted that each day he was compelled to swallow a "witch's brew" of sixteen pills that made him perpetually nauseous. Three times a week there were painful shots as well. He had surgery to drain fluid from his lung and was facing surgery to remove his entire right lung and the lining of his chest wall. Elisabeth Rosenthal, *Doctors and Patients Are Pushed to Their Limits by Grim New TB*, NY Times A1, B2 (Oct 12, 1992).

322. See Specter, NY Times at B4 (cited in note 300) ("'They make it sound so easy. . . . I have to take four kinds of pills three times each day. They make me sick sometimes. I have to come here and sit and wait for my pills. I have to wait for two buses just to get here. It takes hours. . . . I don't think many people want to have this sickness.'").

323. See P. Farmer, et al, *Tuberculosis, Poverty, and "Compliance": Lessons from Rural Haiti*, 6 Semin Respir Infect 254 (1991); Etkind, et al, 6 Semin Respir Infect at 273 (cited in note 220); A. J. Rubel and L. C. Garro, *Social and Cultural Factors in the Successful Control of Tuberculosis*, 107 Pub Health Reps 626 (1992); Sbarbaro, *Public Health Aspects of Tuberculosis: Supervision of Therapy*, 1 Clinics Chest Med 253 (1980); Sumartojo, 147 Am Rev Respir Dis at 1311 (cited in note 270).

with or distrust Western medical care.

The concept of "recalcitrance," therefore, is an oversimplified concept because the individual's behavior is determined by complex social and personal factors. Considerable evidence exists to suggest that compliance is influenced as much, or more, by the health system as by patient characteristics:[324] patient accessibility to the health care system (clinic setting, waiting times, availability of health insurance, and demographic proximity of knowledgeable and sympathetic providers); features of the treatment regimen (duration, side effects, cost, and discomfort of medication); and the health care professional/patient relationship (effective communication, personal and cultural sensitivity). Accordingly, placing statutory duties on the state itself may achieve a greater aggregate benefit to the community than focusing on the behavior of individuals who are perceived to be non-compliant.[325]

Preventive and curative treatment may be the single most important aspect of tuberculosis control. To achieve treatment goals, health departments should have a duty to devise an individualized plan of treatment for all persons diagnosed with active disease. The plan would be developed in partnership with the patient and require her informed consent. Treatment plans would be tailored to the individual's medical and personal needs and address all of the following elements: an evaluation of drug susceptibility with a strategy for effective treatment and prevention of transmission; a creative array of incentives, counseling, and support structures to help ensure the person completes the full course of treatment; and the provision of DOT in a convenient place such as a hospital, community clinic, private physician's office, home, workplace, homeless shelter, or residential care setting.[326] An imaginative range of incentives to encourage voluntary completion of treatment could include street and neighborhood outreach, hot meals, service referrals and placement, free treatment for substance abuse or mental health, tokens and transportation expenses, child care, and modest cash payments or vouchers.

States could consider assigning a public health case worker or advocate to the patient to help ensure that she receives the support and services necessary for following the plan of treatment. Advocates could be recruited and trained from the patient's peer group such as a homeless peer advocate. Case workers or advocates could assist patients in obtaining government services and financial

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324. See Centers for Disease Control and Prevention, *Improving Patient Compliance* at 6-9 (cited in note 266); John A. Sbarbaro, *Compliance: Inducements and Enforcements*, 76 Chest 750 (1979 & Supp).

325. See generally Centers for Disease Control and Prevention, 38 Morbid & Mortal Wkly Rep at 1 (cited in note 24); Centers for Disease Control and Prevention, *National Action Plan to Combat Multidrug-Resistant Tuberculosis*, 41 Morbid & Mortal Wkly Rep 1 (1992).

326. In order to encourage hospitals, clinics, drug treatment centers, and community-based treatment programs to provide supervision for treatment, the state of New York makes Medicaid payments for DOT. Mireya Navarro, *Medicaid Program to Pay to Monitor TB Patients: Treatment Plan Ensures Medicine Is Taken*, NY Times B3 (Apr 28, 1992).

benefits, substance abuse or mental health treatment, and housing. The core strategy for tuberculosis control, then, would move from a model of patient management to one involving a therapeutic partnership that is more humane and arguably more effective.[327]

IV. Population-Based Approaches to Disease Control: The Principle of the Greatest Aggregate Health Benefit

Despite the overriding importance of biological and social determinants of disease, most of the academic discourse has centered on behavioral change. Behavioral change is, by no means, irrelevant to the effective reduction in tuberculosis as well as other diseases such as HIV infection. However, exercise of police powers is not the only, and certainly not the most cost effective, method of obtaining behavioral change. Changing human behavior is highly complex, not well understood, and requires a multi-dimensional strategy.[328]

One dimension, much discussed, is the dichotomy between voluntary and compulsory interventions. Despite over a century of development of constitutional jurisprudence of the exercise of the public health powers, there exists little clear guidance concerning the most basic aspects of compulsory intervention: the need for individualized determinations; the level of risk to justify compulsion; the nature and extent of the procedural due process, and whether there must be judicial or merely clinical determinations; and when the duty to explore less intrusive alternatives is triggered, and the kinds of alternatives that are required.

Another dimension of behavior change is the dichotomy between duties imposed on the state and responsibilities of the individual. Many legal commentators understandably emphasize the responsibility of individuals to conform their behavior to legal requirements—for example, through compulsory testing, treatment, and detention. However, more effective and less burdensome approaches focus on statutory duties to provide services designed to change behavior. Public health interventions such as voluntary screening, counseling, incentives for treatment, and broad-based education can be highly effective agents of behavioral change.

The theoretical problem behind compulsory powers directed against the "recalcitrant" is that it focuses on the behavior of one individual, while virtually ignoring the aggregate effect on the health of the population.[329] Compulsory interventions against a single individual may actually increase overall health risks

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327. Letter from Mark Barnes, Associate Commissioner for Health of New York City, to Paul Schwartz, Division of Tuberculosis Elimination, Centers for Disease Control and Prevention (Nov 16, 1992) (on file with author).

328. See William N. Eskridge, Jr., and Brian D. Weimer, *The Economics Epidemic in AIDS Perspective*, 61 U Chi L Rev 733 (1994); Ronald Bayer, Lawrence O. Gostin, and Deven C. McGraw, *Trades, AIDS, and the Public's Health: The Limits of Economic Analysis*, 83 Georgetown L J 79 (forthcoming 1994).

329. See generally Scott Burris, *Thoughts on the Law and the Public's Health*, 22 J L Med & Ethics 141 (1994); Larry Gostin, *The Future of Communicable Disease Control: Toward a New Concept in Public Health Law*, 64 Milbank Q 79 (1986).

by deterring many others from entering public health programs. Manifestly, the government has a valid objective in seeking to prevent the dangerous behavior of a single individual. But government has an overriding obligation to achieve the maximum possible reduction in levels of morbidity and mortality in the population. Future discourse concerning disease epidemics must dwell on the principle of achieving the greatest aggregate health benefit for the population. Effectuating state objectives for population-based behavior change requires an innovation in thinking about public health law. Ultimately, the achievement of valid health goals may require an examination, not so much of individual behavior, but of the actions of the state itself.